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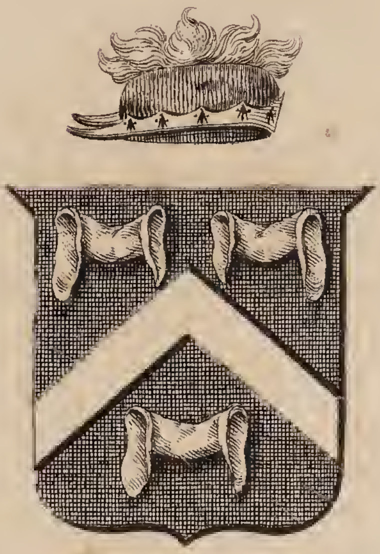

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A COMPLEAT BODY OF HUSBANDRY.

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RULES for performing, in the moſt profitable Manner, the whole Buſineſs of the Farmer and Country Gentleman,

IN

Cultivating, *Planting* and *Stocking* of Land;

In judging of the ſeveral Kinds of *Seeds*, and of *Manures*; and in the Management of *Arable* and *Paſture Grounds*:

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A
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INTRODUCTION.

THE natural diviſion of a farm is into paſture and tillage, the firſt concerns graſs, and the other the various ſpecies of things ſown after plowing. Though this be generally laſt named, it is by much the moſt important, wherefore we have begun with it; and having gone through the conſideration of the ſoil, and of its management various ways for that purpoſe, with the methods of raiſing the beſt crops of the ſeveral uſual kinds; we now come to the other part which concerns the graſſes; and after this we ſhall deliver the culture of thoſe roots which fall in this way, and of ſeveral crops of a leſs general ſort.

Graſſes are of two diſtinct kinds, tho' from their uſe blended together: theſe are the graſs which naturally riſes in the meadow and paſture; and thoſe plants which are ſown in fields, and from the purpoſes they ſerve, are called by the ſame name.

The firſt kind may be comprehended under one term, for its differences are not great; the other comprehends ſeveral, as clover, ſaintfoine, lucerne, and others.

The curious reckon two or three hundred ſpecies of common graſs, but this the huſbandman needs not regard. He will ſee ſome rank and ſome fine: he will diſtinguiſh the graſs of the low meadow from that of the up-land paſture, and both from the ſhort bite of the down; and this is all he needs to mind.

Theſe ſeveral ſpecies taken together, make what we call common, or natural graſs: the others are called artificial graſſes, a term we ſhall uſe in compliance with cuſtom, tho' not the moſt judicious that might have been choſen.

Natural graſs is the produce of our own country, the growth of wild nature, and we have it finer than any other kingdom in the world: the others are principally of foreign origin; and moſt of them have but newly been brought into uſe with us.

Natural graſs will riſe of itſelf, the wind ſcattering its ſeeds every where: the artificial graſſes are to be raiſed by culture; land is to be plowed for them as for crops of corn, and they are to be ſown with as much care and regularity; and they anſwer the expence with a very large return.

We ſhall lay before the farmer the practice of the moſt ingenious and ſucceſsful in different places; and add many remarks that have not been before made publick, relating to the culture of one or two particular kinds; for there is no part of the huſbandman's profeſſion that more needs to be explained.

BOOK VII. PART I.

Of natural graſſes.

CHAP. I.

Of the diviſions of natural graſs into meadow and paſture.

NATURAL graſs grounds are divided into two kinds, according to the place or growth, and the intended uſe, by the names of meadow and paſture; and generally underſtand by that diſtinction, the graſs intended to be cut for hay, and that to be eaten on the ground. But this is an uncertain manner of ſpeaking. By meadow ſome expreſs the graſs of low grounds only, that lie about rivers; and by paſture ſuch as grows on higher lands; but both theſe are by the judicious farmer mowed at times, and fed at others; all that is properly to be underſtood by the two words is, that being uſed together, they expreſs that part of the farmer's land which is not in tillage.

It is of importance to the farmer, to proportion the tillage and paſturage, one to another. There are many who call themſelves farmers near London, and about other great towns, who deal altogether in paſturage; and this they may do without any neceſſity of tillage. But there is no ſuch thing as a man's keeping his farm all in tillage, without paſture. His cattle muſt have food, and his fields for corn in the common way of huſbandry, require a great deal of dung for manure.

This brings on the neceſſity of keeping up a proportion between one kind and the other, for which there is no laying down any general rule; becauſe, according to the nature of his land, and the courſe of huſbandry, more or leſs dung may be wanting.

Experience alone muſt ſhew this, but he will find it eaſy to make alterations where neceſſary: the laying down a piece of corn land for graſs, and the taking up a piece of graſs ground for tilth, being very eaſy.

There are particular eſtates that anſwer beſt in various manners. Some that are ſo rich and proper for corn, and that lie ſo conveniently for dung, that a much greater proportion than the common method may be kept conveniently and profitably in tillage; and others naturally favourable to graſs, and that lie where there is a great demand for it: and in theſe the greater part ſhould be kept for paſture.

As the diſtinction into meadow and paſture is very little ſettled in its meaning, we ſhall, to be the better underſtood by all, ſpeak in general of both under the name of graſs ground. The hay from graſs grounds that lie low, and are what is moſt properly called meadows, is generally in larger quantity than that from ſuch as are higher; but this latter, though there is leſs of it, is ſweeter.

The abundance of water that often gets into, or upon theſe low grounds, makes the graſs rank: and where they lie in the way of conſtant wet, they produce a coarſe kind. We ſee ruſhes in barren and wet places, and there are many kinds of graſs, tho' not enough regarded, that more or leſs approach to the ruſh, which greatly diminiſh the value of the hay, that comes from the wetter ſort of theſe grounds.

Graſs grounds that lie high require aſſiſtances from manure, but thoſe which are lower do not; the overflowing every river ſo far imitates that of the Nile, that it leaves a mud behind, which ſerves as manure, and makes the graſs ſpring as freſh, as if art had been uſed to recruit the ſtrength of the ground.

We have named two kinds of graſs grounds, but there is a third yet to be mentioned, ſuch as are within the reach of ſalt water, whether by the ſides of rivers, near the ſea, or by the ſea itſelf. Theſe are a great quantity in the kingdom, and are capable of being turned to very good account.

CHAP. II.

Of graſs grounds that lie high.

THESE up-land graſs grounds, ſome by way of diſtinction from the lower, call paſtures, the other having the name of meadow. Theſe up-land graſs grounds differ in ſituation as they lie upon higher or leſſer riſings, or upon their tops or ſides: they alſo vary in their ſoil, which, tho' it be in general different from that of meadows, is alſo various in kind between one up-land ground and other.

A certain degree of expoſure is proper for graſs, but there may be too much: therefore thoſe riſings which are of a moderate height, are better for graſs than ſuch as come under the denomination of high hills.

The next difference is, their lying on the top, or on the ſide of a hill; and this is ſo great, that it often trebles the value in one above the other: nothing is more frequent than for ground to be wet and boggy on the top of a hill, while it is perfectly fine on the ſides.

Springs naturally riſe on hills, and when they are pent in, they break and ſoak through the very ſubſtance of the ground, and convert the whole upper part of the ſurface into a bog.

On the contrary, the ſide of a riſing ground that has a gradual deſcent, is, of all ſituations, the beſt for graſs. There generally is moiſture at the bottom, which is very eſſential to graſs; and there is a way for it to run off.

Graſs will not thrive without water, nor can it be good where there is too much: this is the great article. Where the tops of hills have no ſpring, the bleakneſs of the expoſure, and the poorneſs of the ſoil, render the graſs weak: it is ſweet, but there is little of it; and where there are ſprings, it is generally boggy. The way of getting off the water we have delivered in a preceding part of this work, where we treated of draining; we here ſpeak of the natural condition.

The ſide of a hill having ſoil and moiſture, feeds a rich and good graſs, without having ſo much wet as to make it rank, or favour the growth of ruſhes, which generally depreciate that which grows on the tops of hills, or near rivers.

In meadows lying low, there is generally a black rich mould; and nothing more favours the growth of fine graſs; but what theſe grounds gain in ſoil, they loſe by the abundant moiſture.

The up-land paſtures have all that variety of ſoils we ſee in tilled ground; they are ſometimes gravelly, ſometimes loamy, or they are ſtony, chalky, or clayey. Of all theſe, the loamy ſoil, where there is good rich earth amongſt it, yields the beſt graſs; upon clay, it is apt to be coarſe, becauſe of the wet: upon chalk, it is low; upon gravel, it is ſweet, but thin: the loam, when of the right condition, yields it juſt in the middle way between all theſe: it is plentiful yet ſweet, and affords the fineſt hay, and the beſt food for cattle.

It may be often adviſeable to break up a piece of graſs ground on a clayey ſoil, becauſe the clay may be improved by ſand, while in tilth; but not while in paſture.

In Lincolnſhire, their riſing grounds have often a ſoil like that of their low meadows, a black rich earth; but, on examining, there is always too much wet at the bottom; their graſs is, however, much finer than that of the low grounds. In many counties alſo I have obſerved, the tops of hills, in general, dry, and their ſides moiſt: in this caſe the tops bear the ſweeteſt graſs.

A ſoil that is too clayey, is liable to great inconveniencies: in winter it detains wet, and in ſummer it cracks.

Black mould, ſuch as is in the low grounds, yields abundance of fine graſs when it lies dry on the ſide of a hill, but then it is commonly infeſted with worms: loamy ſoils are leſs ſubject to them.

A piece of ſlanting ground, with a loamy ſoil, and a moiſt

bottom,

bottom, is the beſt for paſture; and if he can contrive to bring the water of ſome ſpring occaſionally over it, nothing can add to the advantage: ſuch a piece of graſs ground will require manure at times, but it will anſwer the charge, by the quantity of hay, and richneſs of the graſs afterwards, for it will always retain its natural ſweetneſs. The poorer the ſoil the oftener it will require refreſhment, but this is an expence returned with intereſt.

CHAP. III.

Of graſs grounds that lie low.

THESE are meadows, fen, and marſh lands. All low ground is ſubject to overflowing, either in a larger way by rivers, or in a ſmaller by water from the higher grounds in winter rains. Both theſe wettings are of great benefit, if proper care be taken to carry off the redundant water; and to prevent overflowing at improper times.

The fineſt part of the mould is waſhed off by rains from plowed lands that lie high, and a part of the manure with it, and carried down with the water to the low graſs grounds at their bottom, this renders them ſo fruitful. Land floods drowning meadows by river ſides, have the ſame effect. The waters are thick and yellow, with the richeſt part of the ſoil from the adjoining high grounds, and they leave this upon thoſe meadows. This renders the graſs very plentiful, but as there generally remains too much of the moiſture, it is coarſe; there grow weeds in them, which are not in the ſweet paſturage of the up-lands. There is a great difference in the value of thoſe meadows which are liable to be overflowed by accident, and thoſe which are only capable of being overflowed at pleaſure.

Such meadows as lie flat on the banks of great rivers, are of the firſt kind: theſe are ſubject to accidental floodings, which may come at very wrong ſeaſons; and they are therefore very uncertain as to the produce.

Thoſe which lie near leſſer ſtreams, and little higher than the level of their waters, may be overflowed when it will do them good by turning the ſtream upon them; and theſe are worth much more than other low graſs grounds for this reaſon; as the others, from their hazardous ſituation, are worth leſs.

To theſe two we may add a third kind of graſs grounds, which are of a middle nature. Theſe are ſuch as lie above the level of the water conſiderably, yet not ſo much but that it may be brought over them by means of wheels or engines: this is expenſive, but the benefit is very great. We have not the ſpirit of the Italians in this reſpect, nor indeed the neceſſity:

they raiſe water to a ſurprizing height for the overflowing their paſtures; and they owe all their verdure to that artificial management.

The meadows that lie on the ſides of large rivers, have the ſame general ſoil, which is a rich dark mould: they yield abundance of graſs; and they owe their fertility to the overflowings of thoſe rivers.

When graſs grounds lie near the borders of great rivers, but ſo high as not to be flooded accidentally, it will always be worth the farmer's while to have an engine for overflowing them as he ſhall think proper.

A great quantity of the graſs ground in Lincolnſhire, is what they call fen land. Theſe are of the nature of thoſe flat grounds, which lie near great rivers, and are ſubject to accidental overflowings, but they are of the worſt kind, being liable to receive vaſt quantities of water, and often having alſo reſources of their own beſide. Theſe we have ſpoken of in a former part of our work, treating of the manner of banking and draining them; as alſo of the third kind, which are the ſalt marſhes: theſe are in themſelves poor, and full of the worſt ſorts of weeds, but by draining and banking, they become excellent paſtures.

CHAP. IV.

Of the accidents to which graſs grounds are liable.

WE now come to conſider thoſe accidents to which graſs grounds are liable, and which reduce their value. Theſe are of three kinds, the firſt from weeds, the ſecond from rubbiſh of any ſort, left on the ground, and the third from ant-hills and mole-hills: theſe laſt are the moſt difficult to be removed, and when mowing is conſidered, they are the worſt of all annoyances.

Weeds are hurtful in different degrees. All plants, not of the graſs kind, may be called by this name, but ſome are beneficial: the white trefoil, which is a ſort of clover; and the red trefoil, which is a wild clover, are both ſerviceable.

Large weeds are moſt troubleſome, ſuch as thiſtles, docks and mallows. Theſe are to be drawn with the thiſtle hook.

Rubbiſh muſt always be picked off. Some will be thrown on by careleſſneſs, and ſome comes among manure; which is perceived when the rains have waſhed in the rich part of the dung.

Women or boys may be ſent in to gather up this, which conſiſts of bones, bits of brick, and broken glaſs; a little trouble takes it off, and ſaves a great deal of difficulty to the mower.

CHAP. V.

Of ant-hills and mole-hills.

THE weeds being drawn, and rubbiſh picked off, the ground will be fit for the ſcythe, if there be not ants or moles about it; theſe raiſe hills that will greatly obſtruct the buſineſs.

Some pretend, that in feeding grounds theſe hills are of ſervice, but they err: there never was an ant-hill that did not occaſion ſome miſchief, and where there is one there will ſoon be more.

The loſs is evident, becauſe they cover a great deal of ground; and they bear but a poor quantity of graſs. They not only increaſe in number, but in ſize, when let alone, and ſome have been cut up at laſt that would half fill a cart. They make the ground diſagreeable to the eye, and unpleaſing to cattle. The prudent huſbandman will not follow the example of thoſe, whoſe lazyneſs or ignorance ſuffer them to ſtand, but extirpate them at once: the ſooner he ſets about it the leſs is the expence; and though it be greater as theſe hills are more numerous or large, he ſhould not be diſheartened by that, but aſſure himſelf, that the advantage will always be many times greater than the charge.

There are ſeveral methods of deſtroying theſe hills, but when there is any quantity, the plow we ſhall recommend for that purpoſe, will do vaſtly the beſt.

Some order ſervants into graſs grounds in ſpring, to cut up theſe hills by hand; and where there are not many, this may anſwer. A thin ſhovel is made for the purpoſe: with this the workman is firſt to cut through the ant-hill, beginning at its top, and preſſing the ſhovel down with his foot: he is then to draw it out, and make another croſs cut: this ſeparates the turf and upper part of the hill into four quarters: theſe are to be thrown back, and then the earth underneath is to be dug up with the neſt of the ants. This being done, the four quarters of the turf are to be thrown together again, and they will ſoon cloſe and grow.

This was at one time practiſed univerſally; but the diſadvantages are plain: here is a diſagreeable hollow left in the ground; and ſome of the ants remain in the turf; and having ſo good an opportunity, will ſoon multiply: the hill will be as big as ever in a little time: for they are covered by the turf from the two accidents moſt pernicious to them, birds, and ſevere weather.

There is another conſideration yet; which is, the body of the ants, with the earth taken out of the hole. How to diſpoſe of theſe is no little difficulty. The old cuſtom was to break the clods to pieces, and ſpread it over the paſture. This was not deſtroying the ants, it was only diſperſing them: there was nothing to prevent their getting together again, and accordingly they ſoon did ſo, and the field was over-run with them.

At preſent the farmers about London dig them out, and carry them off to their dunghills, where ſome are deſtroyed, but ſome remain alive to renew the miſchief. Theſe hills mix among the dung, and are carried with it again upon the ground, where the ants breed and multiply.

There cannot be too much care in extirpating theſe creatures. An excellent inſtrument is the ant-hill plow, its ſtructure will be underſtood by any tolerable workman, and we need only caution the huſbandman, that it be made ſtrong in proportion to the ſervice. The timber part muſt be elm or aſh, and its two ſides about five inches ſquare; the iron muſt be thick, and well ſteeled; and it is to be drawn by two or more horſes lengthwiſe.

This will cut through any depth of earth in the hills, and taking them off entire, they may be eaſily removed, and the ſurface left perfectly even.

When the edge of the iron wears, it muſt be repaired, and the implement always kept in order. For the few ants that are left in the ground, are expoſed to all kinds of injuries, and are ſeldom known to be troubleſome again; and the ſmooth naked ſurface being immediately ſown with hay ſeed, becomes uniform with the reſt of the ground.

The expence is little: a tolerable plow may be made for a couple of guineas, and a very good one, fit for any ſervice, for half a guinea more. The price will be ſoon ſaved by the quantity of buſineſs done. As many hills may be cut down with this in a day, as would take ten or a dozen labourers a week.

The perſon who guides this plow, may make it cut deeper or ſhallower as he pleaſes, by raiſing or lowering the handles: and there is nothing it will not make its way through, with a good hand to guide, and a proper force to draw it.

The hills being cut up, there remains the diſpoſing them ſo, that they ſhall not afford a return of the miſchief. The common methods of ſpreading them on the ground, or carrying them to the dunghill, are wrong: but we ſhall ſhew the farmer how he may at the ſame time be ſure thoroughly to be rid of the danger of their renewing the miſchief, and at the ſame time make an advantage of them.

The bare ſpace made by cutting up the hill, is to be ſown immediately; a perſon is always to follow the plow with a parcel of good hay ſeed in his pocket; and while he carefully ſows this on the bare ſpot, others are to follow and take care of the ſubſtance of the hills.

Theſe are to lay them in heaps, not very broad at the bottom, but high and hollow; and when they have ſtood a little to dry, they muſt be ſet on fire, and burnt to aſhes.

Where there are but few of the hills, they may be eaſily piled up in corners, and burnt upon the ſpot, without damaging the ground; but where there are a great many, they muſt be carted off the ſpot, and burnt in ſome waſte place: the nearer the better, for the convenience of carrying back the aſhes. In both caſes, the aſhes muſt be ſpread carefully, and they will ſerve as an excellent manure.

Up-land paſtures require now and then to be refreſhed with ſome dreſſing, there is none better than theſe aſhes; and 'tis in thoſe paſtures, where this is moſt wanted, the hills are moſt frequent.

A ſecond way is to carry the hills all off the ground, and lay them together to rot perfectly. The ants will be thus prevented from a return, for the hills become moiſt throughout, ſo that there is no place for the ants to live among them, they muſt either leave the matter, or be ſmothered among it: one way or other the ground being cleared of them, and the manure alſo: there will be no danger from its going on again. This rotting of the turf takes time, and by that time it is ready for ſpreading, the whole race will be utterly deſtroyed.

A third way is to uſe the hills entire, as they are cut up, in compoſt. We have recommended a covered pit for dung.

Into this the whole hills may be thrown among the mud of ditches, freſh horſe dung, and the drainings of the cow houſe and ſtables. All is kept ſo moiſt, and in ſuch a ſtate of fermentation, that it is impoſſible an ant can live, or any principle of life can remain in what are called the eggs: the addition in point of quantity, will be very great, and the whole may be uſed equally for the plowed land and graſs ground, without the leaſt danger.

A fourth way of uſing theſe ant-hills with ſafety, and to the advantage of the ground, is to make them into a kind of dry compoſt with lime, and other things: this is a ſafe method, and is more expeditious than the other: but different grounds require various manures; and he will therefore take whichſoever of theſe methods beſt ſuits the nature of his particular paſture.

The method of uſing it in form of the dry compoſt is this. When the hills are cut up by the plow, and carried out of the field, they are to be thrown on a heap in ſome waſte place; and a quantity of freſh and ſharp lime is to be ſtrewed pretty thick among them; and ſo managed, as to reach every part.

The beſt method is to ſpread a parcel of the ant-hills on the ground as thick as they can lie, without covering one another; and on theſe to ſtrew a good quantity of lime: then to lay over this another coat of the ant-hills, and then another ſcattering of lime, and ſo on, till all the hills are piled up.

In this manner let the whole remain ten days or a fortnight: in that time the lime will have taken ſo good effect, that there will not be an ant found in the place. Then let a quantity of freſh dung be laid on the heap, and from time to time let it be well worked and turned as other dung is. This compoſt may be laid upon the ground from which the hills were taken; and the benefit, in a tolerable good up-land paſture, will laſt ſix years. This I have found by experience; nor do I know any manure ſo good, on a proper ſoil, for graſs grounds. The bodies of the ants, which are very numerous in the hills, will, in this caſe, add a great deal to the efficacy; for all animal ſubſtances are full of rich matter for vegetation. This mixture of dung and lime with pond mud, is excellent for graſs ground; but when the earth uſed for this purpoſe is impregnated with animal matter, the benefit is vaſtly greater.

When the farmer ſees the practice in its full light, he will be able to count up the gains ariſing from a proper uſe of the inſtrument, and will find that in a courſe of ſix years growth of graſs, the expence of the inſtrument, the labour, and every thing that can be brought into the account, will be above forty times returned to him: all the while he will have his paſture lie in a manner agreeable to his eye, and in a proper condition for the mowers, and for the cattle.

Among the accidents to which graſs grounds are liable, the lodging of water upon them is the principal; but that we have treated of already, under the article of draining.

CHAP. VI.

Of clearing a paſture ground from ſtumps and buſhes.

THE way of drawing large weeds by their roots, has been laid down; but we are here to conſider a greater annoyance, which is, the frequent growth of buſhy ſtumps, and unprofitable ſhrubs. Theſe are not uncommon in up-land paſtures, and are ſuffered in the ſame manner as ant-hills, to remain upon the ground by the idleneſs of the farmer, till they reduce the paſture to half or a third part of its value.

I ſhall here ſpeak of what I have lately ſeen practiſed, partly from my own advice, and partly by the ſpirit and reſolution of the owner; by which about eighteen acres of up-land paſture, have in five years been rendered of four times their former value.

This was one of thoſe up-land pieces, of which there are many in Buckinghamſhire, where the graſs is but little in quantity but very ſweet; and the ground is over-run in patches with broom and furzes.

Walking with the owner, who kept this piece in his own hands, becauſe nobody would give him any price for it worth naming, I propoſed to him to undertake its improvement by two methods; the one was, getting up theſe ſhrubs, and the other, laying on a good deal of rich manure. Few would have had the ſpirit to venture ſo much as he did, upon ſo barren a piece of ground; but three years profit amply returned it to him, and now every farmer in the neighbourhood is deſirous of renting the field. The method he took was this. He had an inſtrument made for tearing all the ſhrubs up by their roots; which, from its uſe, I ſhall call an eradicator. The invention is not mine, but as old as Gabriel Plat, who has mentioned it in his diſcovery of hidden treaſures.

It is a large ſtrong three-pronged fork, which, by the aſſiſtance of a block, as a leaver, is of ſufficient force to tear up any thing. The bigneſs of it is ſo much more than a dung fork, that it ſeems improper to call it by ſuch a name, wherefore I have given it another. The handle muſt be a beam of aſh, fifteen or ſixteen foot long, and its thickneſs ſuch as will keep it firm againſt a great force. The tines ſhould be twenty inches long, notched at the ſides, and a little leaning upwards; and they muſt be joined to a ſtrong ſhoulder of iron, with proper faſtenings for the end of the pole. This being carefully fixed, the perſon that works it muſt faſten a rope of ſix or eight foot long to the end, and take with him a thick block of wood, and a heavy wooden beetle.

When he comes to the firſt ſhrub, he muſt force in the three points ſlanting into the ground, ſo that they go under the root, and the top of the pole ſhall be ſomewhat higher than his head: then with good ſtrokes of the beetle, he muſt drive it well in, till the tines are quite in the ground: he is then to lay the block under the pole, near where the tines are, this will raiſe its top ten or twelve foot high; and he is then to lay hold of the rope, and pull with all his force.

Thoſe who know the effect of the lever, will be ſenſible no root can keep its place againſt this: it will tear up the moſt firm; and in ſome kinds, will draw out fibres of ſeven foot in length.

When one is up, he is to proceed to the next, and ſo through the field; throwing them on heaps as they come up, that they may be ready for carrying off the ground.

The field I ſpeak of when we begun this work, was ſo full of tufts of ſhrubs, that there was not ten yards of it that could have been mowed, and it was very inconvenient feeding.

If we had employed men to grub them up with pick-axes, it would have coſt at leaſt twenty times the price; and the ground would have been tore up in a ſad manner; and when we had done, ſo many of the broken roots would have remained, that there would have been preſently a new parcel of ſhrubs upon the ground: whereas in this way, the expence was little, the price of the inſtrument is no great matter, and it will laſt for ever; and the whole charge of working it was a couple of labourers wages for a few days. The ground was no where broken to ſignify; the roots, in this manner of drawing, only cracking the turf, which fell together as ſoon as they were out; and the biggeſt not ſo much as diſturbing the ground for a foot ſpace, and that moſtly made up again by the falling of the ſurface together.

When the ground was cleared, we got together a large quantity of manure made of old well rotted dung, and the mud of the river; among this we mixed the bottoms of a couple of old hay-ſtacks, a rich rotten earth, full of graſs ſeeds. This being ſpread thick upon the ground, and waſhed in with the next rains, the effect was in a manner miraculous; from a miſerable barren place, it became the next ſpring very fine paſture, and is now a prime piece. The roots of the old graſs ſhot freely, having no longer the woody fibres of the ſtumps to intangle with them, and hinder their progreſs; and the ſeed grew; ſo that here was abundance of nouriſhment, and a great number of plants to draw it.

This is to be done in any place in the ſame manner, and the advantage will be the ſame. Plat might very well call the ſecrets of huſbandry a hidden treaſure, for we ſee ſuch of them as he expoſed to view; nay, ſuch as the moſt common and popular writers copied from him, one after another, yet remain unknown or unheeded by the farmer, who might ſo greatly add to his profits by their uſe. This is an inſtrument no farmer ought to be without, who has any of this poor, and over-run paſture ground upon his hands; and, by a proper uſe of it, I am convinced, that a great deal of what lies nearly as waſte ground in this kingdom, might be made to bear a price. The beſt time for doing this is after harveſt. The ground will then have winter to be quiet; and, in ſpring, the ſhoot will be ſeen ſtrong and fine.

CHAP.

CHAP. VII.

Of improving moſſy paſture ground by burning.

THIS annoyance, though leſs conſpicuous, is as pernicious in the effect as the other.

Moſs is a ſculking enemy to the farmer in his paſture grounds, but a very fatal one: the graſs where this is predominant will appear low and thin, and the cauſe perhaps will ſcarce be ſeen: but on examining there will be found a carpet of yellowiſh moſs ſpread over the ſurface of the ground, through which the few blades of graſs have difficulty to make their way. The miſchief encreaſes continually: for the moſs ſending out its ſide branches and young ſhoots, thickens more and more, and makes the growth of any thing elſe more difficult.

This is commonly the fault of ground that is too damp.

In the ſame kind of land, when a little wetter, we ſee tufts of ruſhes, or a low kind of ruſh graſs; this grows in thick ſods and covers a great part of the ground, nothing grows among it, and not much between it. The ſods ſpread and encreaſe from time to time, till at length they will over-run the whole piece.

Theſe, as they are faults of the ſame kind of ground, require the ſame kind of remedy. What graſs there grows on theſe grounds is ſmall in quantity, ſhort, and poor. In dry paſtures the graſs is frequently ſhort, but it is ſweet; and where there is little of it, that is good; but here it is quite otherwiſe; what poor growth there is, is ſour, and cattle neither like it nor thrive upon it.

The true remedy is burning the rubbiſh with ſome ſmall parings of the ſurface, and ſowing a better crop.

The turf is to be pared up in the ſame manner as we have deſcribed for burnbaiting, and to be ſet up on heaps, and when dry fired.

It will take fire readily, and will preſently burn out. The aſhes will be a rich manure, and the roots of the moſs, and other miſchievous matter will thus be perfectly deſtroyed.

The beſt time is the beginning of October. When the heaps are reduced to aſhes, theſe are to be ſpread upon the bare ſurface and plowed in: the whole muſt be then ſowed thick with hay ſeed. There will ſoon be a ſhort green covering upon the ſurface; and this, as it makes no great ſhoot upwards during the winter, will be all that time ſtrengthening itſelf at the root. It will get into tufts, and in ſpring it will ſhoot up, and be a fine paſture.

At the ſame time there ſhould be drains cut through it in two or three places, to carry off the water that occaſioned the dampneſs: and thus the owner will have a right to expect a new kind of produce, for he will have a ſort of new land.

In the choice of the ſeed, care is to be taken it come from hay that has grown on land not altogether unlike this, in reſpect of moiſture.

Botaniſts reckon up many kinds of graſs: as ſome graſs grounds are moiſt, and ſome dry, there are certain kinds that grow on the one, and certain other kinds on the other; the farmer is to ſuit his ſeed ſo far to his ground, for that of the graſſes that delight moſt in wet ground will not ſucceed on ſuch as is dry; and the ſeeds of graſs from upland paſtures will, in a great meaſure, miſcarry in meadows. Therefore when hay ſeed is taken for the purpoſe of ſowing this new recovered land, it muſt be got from ſuch hay as has grown on meadows in low places. This will ſtrike freely and ſpread properly, ſo that there will be no danger of a good crop of hay the very firſt year; and from that time the ground will continue encreaſing till the third; after which, if no farther care were taken, it would decline; but the huſbandman muſt take precautions accordingly.

The effect of burning the ſurface, which is very great for the time, and laſts ſome few years, afterwards leaves it worſe than it was.

As the ground will grow weak after three years, care muſt be taken to renew it by proper manures before that time; and the beſt for this purpoſe are thoſe which are moſt laſting in their effects.

If there be marle in the neighbourhood, a good quantity of that ſhould be laid on at the end of two years, taking advantage of a dripping time in October. The fineſt part of the marle will ſo be waſhed into the ground at once; and the harder lumps will break with the froſt, and then their ſubſtance will in ſpring waſh in after the ſame manner.

Where there is no marle, pond mud is the beſt manure; but this never ſucceeds ſo well as when it is mix'd with rotten dung, and the bottoms of old hay ſtacks.

C H A P. VIII.

Of improving graſs ground by manures.

DUNG is an univerſal manure for graſs, and the more mellow and rotten it is, the better: moſt people content themſelves with this, and ſeek no farther, but graſs ground being of different ſoils, admits with advantage a diverſity of manures.

For graſs ground where the ſoil is a fat loam, the beſt manure is old dung and pond mud mixed together. The time of laying it on is according to the uſe the farmer makes of his land, from September to February.

The moſt favourable time is in the middle of winter, that there may be froſt to diſſolve the harder parts of the manure, and the rains may waſh the whole into the ground, while there is no great power of ſun to evaporate the virtue.

The way of laying it on is to drop it in ſmall heaps at due diſtance; and employing labourers to break and ſpread it well by hand, to have it worked over afterwards with a buſh harrow.

This harrow is to be lightly drawn over the ground, till the whole quantity of manure be torn to pieces, and ſpread; it will then be ſoon buried among the riſing ſhoots of the graſs.

Whatever other dreſſing we order to be laid on graſs ground, this, ſo far as its nature allows, is the manner of ſpreading it.

When a piece of graſs ground produces moſs, but not in ſuch a degree as to require cutting up and burning, the beſt method is to ſtrew over it twice a year, namely, in October and in the beginning of February, a mixture of two part coal aſhes, and one part wood aſhes, wetted with emptying the pots of the family.

On a piece of graſs ground that is cold, but not very wet, let the huſbandman ſpread a good dreſſing of pigeon's dung; or of the dung of fowls mixed with earth and coal aſhes. This is to be done at the latter end of February, and being the richeſt of all manures it muſt be ſpread with the greateſt care: it will thus come to the roots of the graſs, juſt as they are about to make their ſhoot, and will cauſe twenty blades in many places to grow for one.

There are good graſs grounds on ſoils quite oppoſite to what we have been naming, that is, on ſuch a loam as having a great proportion of ſand, and little of the binding ingredients in it, is hot, looſe, and crumbly. In this caſe the manure muſt be varied; nothing comes near the virtue of one of thoſe clayey marles we have deſcribed under the head of manures; a dreſſing like this laid on early in winter, becomes quite broke and mouldered by the ſpring, and will all waſh into the earth: the conſequence is that it gives the two qualities that are wanting, firmneſs and fatneſs. The quantity of hay may be doubled by ſuch a dreſſing, and the feeding in proportion; and although this be an expenſive manure for graſs lands in the firſt laying on, yet it well anſwers in the end; for the effect, inſtead of three or four, (which is the common duration of manures,) will laſt ten or twelve years.

There is a hungry, cold, brown ſoil, not uncommon in paſtures, conſiſting of poor loamy earth, and gravel. On this no manure anſwers like chalk: but then it muſt be a proper kind, otherwiſe there will be damage inſtead of an advantage.

There is chalk as hard as a ſtone, and there are other kinds almoſt as ſoft as butter. If the firſt ſhould be uſed it would lie like ſo much rubbiſh on the ſurface, and cover one half of the ground without doing any good to the other: but if the ſoft kind be choſen, it breaks and diſſolves with the weather, and waſhes in entirely. November is the proper ſeaſon for laying on ſuch a manure, and the froſts acting on it firſt, and afterwards the rains, it will all work in ſo perfectly, that by Lady Day there ſhall not be a lump as big as a nut any where ſeen upon the ground.

In ſome of the up-land paſtures in Derbyſhire and Staffordſhire, there is a kind of brown earth full of fragments of ſtone. The proper manure for this is lime: we have ſhewn what a vaſt effect this takes in ſweetening and fertiliſing land; and it has altogether the ſame in paſture as in plowed grounds.

When a graſs ground is very ſandy, the crop muſt be very thin, but the graſs will be ſweet: in this caſe a ſoft clay, with a ſmall mixture of ſand among it, ſerves as an excellent manure; for the ſand will make it break and moulder, which clay alone would not, and thus it will waſh into the ground. Thus it will give firmneſs and a body to the ſoil, and as to the ſmall quantity of ſand that gets in along with it, that is only added to the general maſs, and can do no great harm.

Theſe manures ſucceed on the various graſs grounds; and theſe are the beſt times of laying them on. The expence of them ſhould never deter us from their uſe, for that the very deareſt always bring a manifold return.

CHAP. IX.

Of the general management of graſs ground.

THE two purpoſes to be anſwered by graſs ground, are feeding cattle and the affording hay: the farmer is to conſider their ſeveral benefits, that he may know where to borrow from one, for the advantage of the other, when he knows the profit will be anſwerable.

The firſt conſideration is to be the time for feeding, and the time for laying up for hay. This varies in different parts of the kingdom. The ſituation and condition of the ground makes ſome difference alſo on this head natural and neceſſary;

and the circumſtances of the farmer, with reſpect to feeding, muſt in ſome inſtances be allowed to break in upon what is known to be right.

Where they have plenty of manure, and make two crops of hay, the cuſtom is to lay the ground for it about the middle of February. In this caſe a little more than three months gives it a growth for cutting; ſo that there is hay by the middle of May: in other places they are five weeks later in laying the grounds for hay: the latter end of March is a common time.

In the north of England they are as backward in their haymaking, as their corn harveſt, and they lay their graſs lands for hay accordingly. May Day is, in ſome places, not an uncommon time.

There is nothing ſo wrong as defering the laying ground for hay ſo long: it may be convenient to him to feed upon it; but let him conſider what will be the effect of a hot dry ſummer, and what will be the loſs, if he be diſappointed of his crop. Spring is the ſeaſon for the graſs to make its ſhoot; and if it be eaten over and over again at that time, and hot dry weather follow, it is deprived of the benefit of rains, and never makes the firſt ſhoot tolerably, nor comes to any reaſonable growth afterwards, let the farmer ſuit his ſeveral occaſions ſo, as to be ſure of laying down his ground for the hay in time; and if he loſe ſomething in the advantage of feeding, he may be aſſured of making himſelf ten-fold returns for it, in this more profitable article. We ſhall begin the management of graſs grounds with the preparation for laying them down, and from thence date the beginning of the farmer's care.

We will ſuppoſe him in the middle of March, to take off his cattle from the grounds where he has good expectation of hay, and to prepare for it by making all clean and even.

As ſoon as the cattle are off let him ſend in women or children to finiſh the clearing of the ground, by picking up the broken boughs of trees, and every other annoyance: this done let him ſend in a labourer or more, according to the compaſs, to break and ſpread all about, the dung that may have fallen from the cattle; and alſo to break and ſcatter any freſh mole-hills.

This being done, the expence of which is little, and the convenience and benefit very great, let him order the ground to be rolled.

The rolling graſs grounds intended for mowing is of great conſequence: it prepares the ſurface for the ſcythe, and deſtroys the laſt accidents that can happen to it during the preparation for hay.

In the winter months the ſurface of the ground will be rendered unequal, by the treading of cattle, in ſuch places as the wet has moſt affected, and where it has lodged moſt: theſe make the growth of the graſs ſo far irregular, and therefore are an injury.

During the firſt approach of ſpring the worms will be at work, and will, every damp and mild night, throw up abundance of their caſts; theſe alſo are nuiſances, though not great ones, and they hinder the right and regular growth of the graſs: if there be moles, or if there be any ants left, they will alſo be at work at the ſame time. This is a ſeaſon at which all ſhould be ſet right; and the condition of the ground is ſuch that it will eaſily be ſo. The roller will anſwer the purpoſe, for it will take more effect now than at any other time.

The winter's froſts will have mellowed all theſe broken parts of the ground, and the ſpring rains will have ſoftened them, ſo that the roller will cruſh them. The rubbiſh of all kinds has been taken off, and all the old unevenneſſes taken down, ſo that there can be nothing in the way hard or different from the general ſurface. The roller will break all the little irregularities there are, and laying the ſurface perfectly even, will make way firſt for a regular growth of the graſs, and next for the eaſy cutting of it.

The roller is to be of wood, but it muſt be made as true and even in its ſurface, as if cut out of ſtone, or caſt in iron. The heavier it is, the better; therefore it ſhould be large. The trunk of a good ſound thick elm makes the beſt roller; but the lower part muſt be cut away to a truth, and none of the bark ſhould be left on.

We have ſhewn how to cut up his ant-hills. But this is a practice that will, in a great meaſure, prevent the expence and trouble. The ſpring is the principal time when theſe little vermin are at work; and if they be prevented then, they will, in a great meaſure, lie ſtill till that time twelve month. The rolling with a roller of proper weight, deſtroys their new work, and kills a great many of them; after which the reſt ſcatter ſo, that there ſeldom is any miſchief.

There is a farther uſe in the rolling of graſs ground: this is, the preſſing down the earth about the roots, and by that means ſecuring the young ſhoots, on which a great part of the hay depends.

Froſts are moſt fatal to plants, when the ſpring has been ſome time advanced: the heat of the weather making the ſucceeding cold of the nights more hurtful.

In the ſucceeding months, if there do not fall rain, the ſun parches up the roots if the earth be left looſe about them; but when it is thus preſſed down, they are defended.

This has alſo another effect of great conſequence, in preventing the lodging of the graſs: that accident, which is as miſchievous in a manner to graſs as to corn, happens principally from the looſeneſs of the earth about the roots. When the graſs or the corn has ſome height, the wind will take effect upon it, and bear it down; but then if it be well ſupported at the bottom, it riſes again as ſoon as the blaſt is over. The wind rarely breaks the ſtalk of corn, and more ſeldom that of graſs; ſo that unleſs their ſupport fails them at the root, they riſe. When the earth is looſe it gives way, and being preſſed down, they remain down; but when it is firm about their bottom, no harm happens: rolling always gives it this firmneſs, and therefore prevents that accident.

When the roller is brought upon the ground, a careful perſon ſhould be employed in managing it: it muſt be drawn equally, and ſlowly along. The firſt care is, that it go over every part of the ground; and the next that it be drawn leiſurely, for otherwiſe it will not do half its buſineſs. Whoever will watch the paſſage of a garden roller, over a gravel walk when it is a little wet and rough, will ſee plainly this difference: the ſame roller, when drawn haſtily over the walk, ſhall take very little effect; which, being brought over it carefully, and ſlowly, will make all level.

In this manner the roller is to be drawn over the paſture or graſs ground intended for hay; and the farmer has then nothing more to do, but to ſee his fences are ſecure, and leave the growth to nature; the ſhoots will be numerous and firm, and there will grow a large, and every way excellent crop. In low grounds the cattle may be ſuffered to feed ſomewhat longer than in the up-lands, unleſs the ſeaſon be very wet; ſo that it is ſome relief to the farmer. Though he ſhould lay his higher grounds at the time we have directed, he will have, in a tolerable ſpring, a fortnight or three weeks; and, in a very dry one, a month more for his low grounds.

In theſe, as well as the others, when they are laid for hay, let him take care to have the ground levelled, and rubbiſh picked off; for, when the mowers come to work, all that charge will be very well returned. There will be none of thoſe ſtops and ſtayings that there are, and always muſt be when there are hillocks, and other impediments in the way; and the mowers will be able not only to go on with their work regularly, but to come an inch cloſer to the ground; and this is a very great concern. The farmers have a very juſt obſervation, that one inch of hay at the bottom is worth three at the top, and they have reaſon: nor is the aftermath at all the worſe for this cloſe cutting. That does not depend upon the ſtumps of the old graſs that are left, but upon the new ſhoots made from the root; and the cloſer thoſe are cut, the more free that ſhoot comes, ſo that the cloſe mowing is every way an advantage.

CHAP. X.

Of mowing.

THE ground being carefully laid for hay, the farmer has no farther care but the knowing when to cut it. This he muſt carefully obſerve: for there is a proper time of ripeneſs; and all after, as well as all before that, is ſo much loſs.

When ground is laid early, and has been properly aſſiſted by manures, it will often be ready to cut in the latter end of May.

There are thoſe, who, in a forward ſeaſon, cut it earlier, taking the firſt appearance of ripeneſs, imagining they are ſecuring their intereſt, by preparing early for a ſecond crop; but they often loſe more in the firſt, than it is poſſible they ſhould get in the latter. The firſt crop of hay is the great article, and ſhould be regarded accordingly: the other is always trifling in compariſon.

There is a time of the year when every plant flowers; and graſs, like others, has its ſeaſon. In other plants, though their leaves ſtand pretty well during the flowering, they wither when they come to ripen the ſeed. The leaves of graſs go to the quantity of hay as well as the ſtalks; and are indeed the beſt part; they are not therefore to be neglected for the ſake of the other. The common kinds of graſs, in well managed paſtures, get into flower in the end of May, or beginning of June, this therefore is the natural and proper ſeaſon for cutting of them. The hay will not have its due quantity till the ſtalks are full grown; but after that time, the leaves will fall ſo faſt into a ſtate of decay, that there will be more loſt by twenty times at the bottom, than there is gained at the top. The price of hay is very conſiderable, but that depends upon its goodneſs; and this upon two articles, the time of cutting, and the manner of making; and upon the former little leſs than on the latter.

The faults in making are moſt obvious, but there may be poor hay got from a good piece of ground, either before, or after the right ſeaſon of mowing; while that which is truly excellent can be had only by ſeizing the right time.

The green colour of hay is valued. This is owing to the making; but it muſt be in the graſs itſelf, otherwiſe all the care that can be taken in drying is in vain: a proper method of turning will preſerve a colour, but it cannot give it: that muſt be from nature.

This colour depends on the time of mowing, or the degree of ripeneſs. When it is juſt in flower, the leaves are freſh, but when it is got to ſeed, they grow brown: this is the firſt ſtep toward decay, and this change of colour no art can recover.

While the graſs is coming to perfection, it is too green; when it has ſtood too long, it becomes pale; and that fine green ſo eſteemed, can never be obtained by any art afterwards.

The ſmell is another article of value, and this muſt be preſerved by care in making, but it muſt be owing to the time of cutting.

Hay that has ſtood long, has the appearance of ſtubble, and has no more ſmell; whereas at the time of flowering, there is one of the pleaſanteſt flavours we know, from the cutting through of the ſtalk, and the evaporating of its juice in drying. The colour of the ſtalk fades as well as that of the leaves, after the ſeaſon is over; and we ſhall ſee this plain enough, if toward autumn we look upon ſuch graſs as has run up among buſhes, out of the reach of the ſcythe. The ſtalks of this were at one time in a condition to make fine hay, but we ſee them dry, brown ſticks, without taſte, ſmell, or any other quality.

The whole depends upon this principle, there is a ſtate of perfection in all vegetables, and the art of the huſbandman muſt be employed to obſerve, and his prudence to ſeize it. This ſtate of perfection with reſpect to an entire plant, is juſt the time of its flowering. When we mean to ſave ſeeds of any thing, we muſt ſtay longer; and, in that caſe, we ſee the plant wither; but the time of its perfection is juſt the coming into flower. The apothecary buys his herbs for diſtilling at that period, knowing that juſt when the flowers are opening, the ſtalks, leaves, and every part are the fulleſt of virtue: and it is ſo in graſs. The farmer muſt make the ſame choice.

Now we have given the reaſons for chuſing graſs at ſuch a period for mowing, we ſhall deliver the marks by which it is known to be ſo. Let the farmer examine the whole plant.

Thus let him go into his graſs fields from time to time. Let him examine the ſtalks, and ſee how their tops approach toward ripeneſs; he will perceive the heads ſwell, and at length there will appear a few white threads. Theſe, in ſome kinds only ſhew themſelves on the ſurface; and, in others, hang down a fifth part of an inch. This is the flower of the graſs, and when it appears, the hay time is near.

He muſt not judge from one or two plants, but ſee when the whole field thus gets into bloom; and then he muſt be critical in the examination. The fuller and freſher it is at the top, while the bottom remains ſound and good, the better; therefore that is to be examined for the final marking of the time. Let the farmer open the graſs with his hands in ſeveral places, down to the ground, and obſerve how the lower part looks: as theſe flowery parts ripen, the bottom will grow brown. This is the firſt mark of decay. After this the top will get nothing; and the bottom will loſe a great deal, ſo this is the time for the mowing.

Mowers are to be ſent in, and the ground having been prepared and levelled, they have no excuſe if they do not cut it cloſe. Theſe are a ſort of people who are very apt to ſlight over their work, and ready to ſeize upon any pretence for doing ſo: they have no conſideration that their careleſſneſs is the loſs to the farmer, perhaps of a tenth part of his crop: but let him take care of it himſelf: as he has prepared the ground for them, let him follow them, and frequently put them in mind of it: they will thus be brought to do much better than when left to themſelves; and the addition to the quantity of the hay will very well pay the farmer for his attendance.

We ſee farmers about London, riding in their grounds among their hay-makers, but this is an idle cuſtom: let them walk after their mowers, and they will do themſelves twenty times the ſervice.

The buſineſs of hay-making is generally done better than that of mowing; and if any omiſſion be made in it, 'tis eaſily ſeen, and there is time to rectify it; but in the mowing, the miſchief is ſcarce to be ſeen, unleſs the ſcythe be followed; and when it is once done, there is no mending it.

The graſs being down, is to be carefully dried. In this there is ſo much difference between the practice of the farmers in the parts of the kingdom where huſbandry is moſt improved, and the others, that it ſhould be ſet in the ſtrongeſt light, to render thoſe improvements univerſal.

CHAP. XI.

Of hay-making.

WE have directed to cut down graſs at a time when it has a full body, and a fine colour; and ſhall now ſhew the methods by which that may be preſerved, and the neglects by which in many places it is loſt.

In the leſs improved parts of the kingdom, the hay-making ſeaſon comes very late. They allow little manure to the grounds, they lay them up late; and, conſequently, in the moſt favourable ſummers they have but a poor crop of hay, compared with thoſe who take better meaſures.

In theſe places the farmer never thinks of cutting his graſs till it begins to look brown at the top, which indeed it does ſooner than it would if better ſupplied with nouriſhment; and then it is failing at the bottom.

At that time he ſends in the mowers, who cannot cut cloſe becauſe of the unevenneſs of the ground; nor does he inſiſt upon it, for he imagines that the more they leave, the better will be his aftermath. The error of all this we have ſhewn, but we are ſenſible it is too common in a great part of the kingdom at preſent. When graſs is thus cut, it has neither a good colour, nor ſmell; no art or management could make fine hay out of it; but if that could, it has not the chance; for the hay-making is as little underſtood as the mowing.

They let it lie in the ſwarth, and think they do enough if they turn it two or three times in the ſun, never putting it into cocks, till they ſuppoſe it nearly made; they then put it up in large cocks, and let it ſtand a week or ten days to ſweat; and then take it home, and put it up in a great rick.

Many have wondered at the difference between the hay about London, and that in remote parts of the kingdom: but none will be ſurprized who ſees this reaſon. The whole management is bad there; and, in general, good here.

The great care is to preſerve the colour. The graſs being cut in the right condition, will be of a fine green, and the farmer may be aſſured, a loſs of colour in hay is always attended with a loſs of taſte, and loſs of ſmell; and a certain loſs in the price.

To preſerve the colour, and give it the full ſweetneſs, it ſhould be let to lie in the ſwarth two days and a half. Then it is to be ſpread out, this is properly what is called tedding of the hay; and thus it is to lie expoſed to the ſun during the remainder of the day. It is to be made up into little cocks, which are called graſs cocks, at evening, and ſo left for the night. The next morning, as ſoon as the dew is off the ground, theſe graſs cocks are to be ſpread, and thus the ſide of the graſs that had lain undermoſt, will be dried. In this condition it is to be all that day. Toward evening, it is to be cocked up again as before.

This is an excellent practice, for it at the ſame time gives the hay all the advantage of the air and ſun during the day, and defends it from the dews of the night; which can do little harm when it is gathered up in theſe heaps. I have ſeen when this cocking up at evening has been omitted, the whole quantity which was very forward in drying the day before, has been damp and ſoft, and brought into a worſe condition than at firſt; for the water of the dew is more hurtful to its colour than the natural juices of the graſs. In this condition the ſmell and colour have been greatly impaired, and there has been no way of recovering them. This is not ſo bad as the practice of the remote farmers, whoſe hay is always brown, and mow-burnt; but it is much inferior to the true and careful method, and never fails to reduce the price.

In the proper method after tedding, and graſs cocking, ſo far as we have named, the hay is to be ſpread again, and drawn up into a kind of lengths, which they call windrows. Theſe windrows are eaſily thrown up into cocks, for they lie conveniently for that purpoſe: thus when the weather is fine, the hay has the full advantage of it, and if rain come on, the hay-makers can toſs it into cocks in a few minutes, in which condition it will get little damage, and is ready to be ſpread again to take the advantage of the next fair blaſt.

From theſe windrows the hay is to be thrown into large cocks, and in theſe to ſtand through the night, and for ſome time afterwards: but it is not, though pretty well made, to be carried home directly from the field in this condition. The outſide of one of theſe large cocks will be very dry, while there is moiſture in the middle, and the farmer's buſineſs is to have his hay all alike; not only ſome of the juices of the graſs will remain in that which has been in the innermoſt part of the cock, but it will ſweat a little with lying together: therefore theſe cocks muſt be thrown to pieces, and the whole quantity of the hay once more ſpread upon the ground. If good weather follow, it will dry in a very compleat and perfect manner: three hours wind and ſun going farther than a day at another time.

If the weather continue favourable, the hay-making is thus finiſhed; but if rain come, he is not to turn the hay that has catched the wet as it lay ſpread, but to let it dry as it lies, which it will quickly do. On the contrary, if the over care of the hay-makers ſhould turn the graſs thus nearly dried, and then wetted by accident to the ground, the damp of the earth would injure it. As the wet is ſlight, and the ſun and air have great power; the top will preſently dry again by lying as it is.

After this ſpreading from the cocks, the hay may be thrown together for convenience of loading, and is in perfect good condition to carry in.

This is the true method of hay-making, but, in ſome caſes, farther care may be neceſſary.

We have directed the farmers to get up all large weeds: but when this due care has been neglected, more time, and greater caution will be required in the making of the hay. When there are thick weeds among the graſs, there muſt be more time to dry the whole than where it is clean, for theſe have more moiſture: and if the hay be put up damp with them among it, they will give afterwards.

The more hands are employed in making hay, the better; and a careful eye muſt be kept over them, to ſee they do their duty.

CHAP. XII.

Of the aftermath, and the winter uſe of graſs grounds.

THE hay of the firſt crop being carefully ricked, that trouble will be entirely off his hands. If the weather be favourable, his intereſt is to keep it till perfectly dry upon the ground; but if it be precarious, he may ſtack it ſooner, obſerving the caution we have given to keep a hollow in the centre of the ſtack to prevent its heating.

The hay being out of hand, his care is to return to the ground.

In the more improved counties where the firſt crop comes early, they expect a ſecond; and keep the ground as carefully for this as for the other.

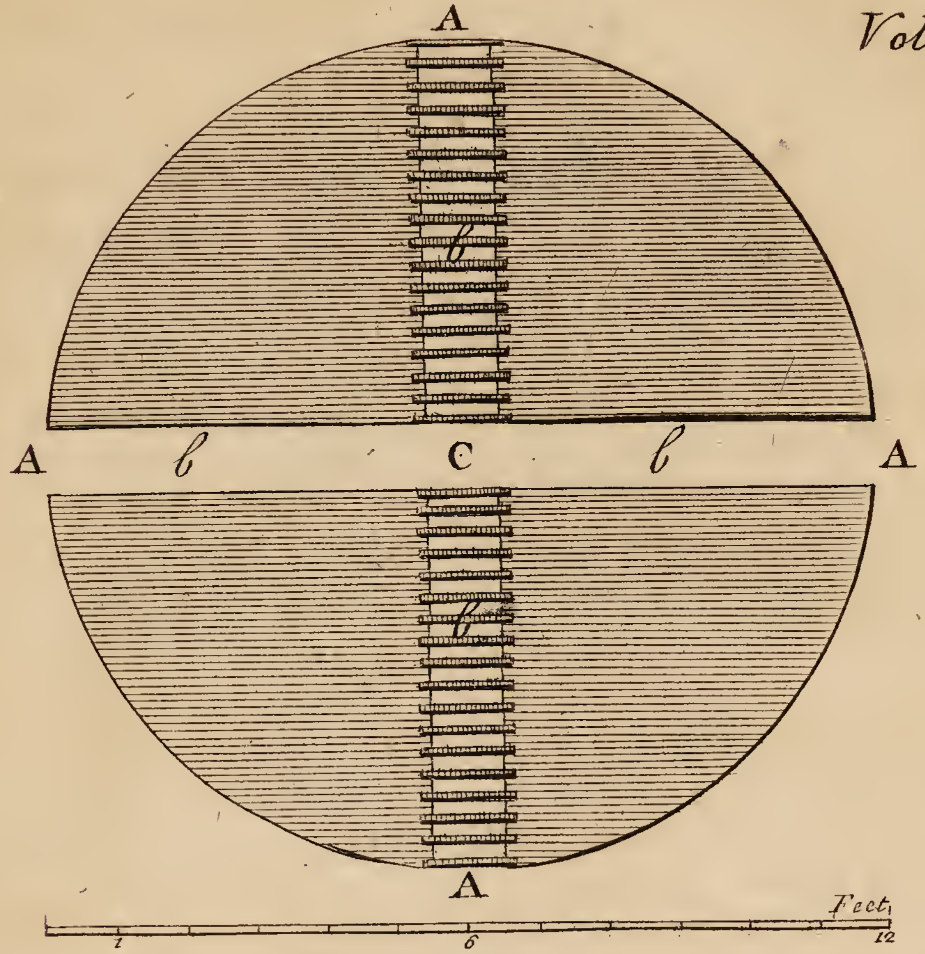
The new growth is to make the ſecond crop of hay: but, at the beſt, that is inferior to the former; and, upon the whole, the huſbandman is often in the wrong to depend upon it.

None but good ground, and what is kept very well in heart, will afford a ſecond crop worth cutting; and even this not well, unleſs the weather favours. At the beſt the profit is but moderate, and the hazard is conſiderable; ſo that in many caſes, it is better to uſe the ground for feeding.

Where manure is ſcarce, and where there is not all this exact care uſed about graſs grounds, the farmer muſt not expect the advantages

PLAN *of a* FOUNDATION *proposed for* STACKING HAY *upon, to prevent its Firing, tho put up with more Sap in it, or in a greener Condition than Ordinary: One Stone of Such Hay having more Nourishment in it than two or three of the Common Sort.*

Vol. III. p. 26.



AAA. *The Circumference of the Foundation, laid with dry Stones or Brick & raised only one foot above the Surface of the Ground.*

b,b. *Four Croſs Gutters, each one foot Square in the Bore, meeting in the middle of the Foundation, to be all covered over with loose pieces of Wood or Stone as one of them is in the Plan for Example.*

In the Center of Communication to all the four Gutters, place a Common Sack Upright with a round Bottom, Stuffed with Straw; & as the Cock raises, draw up the Sack a foot or two, till it be quite finished a top; then draw out the Sack, & leave its Track open a top as a Vent to the perpendicular Flue, till the danger of overheating be over, when it may be covered over & Thatched.

This greenish Hay begining to heat, soon rarifies & expands the Air contained in the perpendicular Flue, which is continually expelled a top, & succeeded by the Indraft of the cool dence Air from the Gutters below so long as the least heat remains in the Cock, which will prevent firing overheating & Mow-burning over much, especially if it be considered that no part of this Cock is distant above three foot from the ambient Air without or the Circulation thereof in the Center.

When the Cock is cured Thatched & quite cooled, the Gutters should all be Stoped on the Outsides with Wisps of Straw, or yͤ Hay will not keep so long & well as it might do, But if intended to be used in 3 or 4 Months afterstacking, keep yͤ Gutters open the whole time, but the flue a top must always be closed in at Thatching time.

Compleat Body of Huſbandry.

advantages we name, to him who uſes more art, and more expence in his improvements. It is not every ground in the moſt improved counties that will yield a ſecond crop of hay to advantage, and in the leſs improved grounds, the huſbandman is not to expect one crop every year.

The crop of hay from graſs grounds, is like that of corn on the plowed land, the utmoſt the ſoil is able to produce; and it exhauſts it accordingly. Therefore as in the counties where leſs improvement by manure is uſed, a fallow once in three years is allowed to recover the heart of the ground; in ſuch places, the crop of hay ſhould alſo be once in three years ſpared to give ſtrength for the others.

There is ſome advantage in this, which may be called the year of fallow for the graſs, in that it is not altogether uſeleſs: for, though it is not to be mown that year for hay, it may be eaten by the cattle. There will be the more upon it for them, becauſe the heart is not ſuffered to run up to head for hay: and their dung as they feed will be enriching and improving the ground.

This will be perfectly underſtood by what we have before ſaid of the growth of plants in general. The root ſupplies the leaves with abundant nouriſhment, while there is no ſtalk: when the ſtalk grows it demands a great deal, the leaves therefore have leſs; and when the ſeed comes toward ripening, all the care of nature is directed thither.

This ſhews the advantage of the year of fallow, as it may be called, to graſs grounds, that is, the year in which they are fed, not mowed. The growth of the graſs into ſtalk exhauſts the root, and ſtarves the leaves. This is ſuffered in the hay ſeaſon, and it is therefore the hay crop exhauſts the land.

When a piece of graſs ground is kept a whole year for feeding, the ſtalks are eaten off as they would riſe, and the leaves being alſo conſtantly cropped, new ones are continually ſent up in their places; which being again eaten down before they are of a ſize to exhauſt the roots much, the whole plant is kept in a condition of conſtant vigour, and the roots in ſtrength and heart.

In this manner the year of fallow is to be conducted in thoſe counties, where the want of improvement renders it neceſſary: with us the aftermath is to riſe to a new crop for mowing, or to be eaten on the ground, according to the circumſtances and occaſions of the farmer.

In eating it off, the larger cattle are to be let on firſt, and ſheep afterwards. Theſe will eat where the oxen and cows can find nothing more; and when the ground is fed down in this manner, it muſt lie a few weeks to recover, and then the cattle are to be turned in again. This compriſes the whole management of paſturage.

When paſture ground is overflow'd, let the young farmer follow the directions compriſed in the following letter.

Mr. Osborne, Jan. 15, 1756.

SIR,

I Have peruſed Mr. ———'s letter to you of this date. That learned and uſeful member of ſociety, as well as great genius, does me much honour in declaring, my ſimple contrivance for ſtacking hay with ſafety, met with the favourable reception and good opinion of the publick; and that it has been of any ſervice and credit to ſo important, and, as far as I am able hitherto to judge, ſo excellent a work as the preſent body of huſbandry; every number of which I wait with impatience, and read with ſatisfaction, pleaſing myſelf with a conſcious view of ten thouſand cornu copia's, and national benefits riſing out of it.

If the remainder of this noble work be equally conſidered, and equally ſupported by ſcience and practice, I ſhall not heſitate to pronounce it an honour to the Britiſh nation, as well as the undertakers; and doubt not but it will ſoon fly through the living languages of Europe.

I flatter myſelf the plan and deſcription of my new invented granary, which I deſired you to tranſmit to the gentlemen concerned, may merit their conſideration: it coſt me much thought and contrivance to make it ſtrictly ſupportable by the laws of pneumaticks, and to anſwer all its purpoſes with œconomy, and without the late ingenious invention of ventilators, to which the Engliſh and French have hitherto confined themſelves.

That learned gentleman makes uſe of an argument that will always command my regard and beſt endeavours, the publick good; and he has with ſincerity, my warmeſt deſires to ſerve them, and oblige him in his requeſt.

I ſhall firſt ſay, in the preſent caſe, that I apprehend no engine in nature can be properly and efficaciouſly applied, to the ſpeedy draining of great ſurfaces of lands accidentally overflowed.

We muſt allow that wind, ſun, falling of rivers, and imbibition of the earth are the productions of the great engineer: he leaves it to us to find or create levels, in this particular caſe, if we are impatient of his operations; and he expects we ſhould, on ſuch occaſions, add the knowledge and ſkill with which he has bleſſed us. I ſhall

I ſhall only obſerve, nothing can be attempted by us, whilſt one uniform ſurface of water covers contiguous rivers, drains, ditches, and lands, as in many places it does at preſent; but the moment ſuch rivers or drains have acquired a natural level, by the running off of ſome part of the inundation, the higheſt parts of thoſe overflowed lands beginning to appear, the moſt adviſeable inſtrument to apply is the Lincolnſhire trenching plow, or, for want of it, a ſtrong common two wheel plow; beginning near the river, or level's edge, and cutting up as far as conveniently may be, into the ſhallow verge of the ſtagnant inundation: aſſiſting the cut occaſionally with the ſpade.

This main cut, after the waters have wholly diſappeared, ſhould be enlarged in depth and breadth, and ſeveral ſmaller lateral cuts be made with the plow, where the gradual falling of the body of water indicates; by marking out daily the ſucceſſive verges of all the ebbing pools or ſhallows, that approach neareſt to the level of the main cut, and afterwards running the plow along ſuch marked lines of direction, thereby opening the eaſieſt communications between the ſeveral ſhallows and the main cut; employing the ſpade alſo in ſuch lateral cuts where neceſſary.

This is the beſt time to diſcover the trueſt and moſt advantageous ſituation for ſuch open drains, and to obviate an injurious duration of ſuch future floods or inundations, water being the beſt and cheapeſt level for the induſtrious farmer when it happens ſo; and its retreat, eſpecially in large paſtures, ſhould be carefully watched and ſtaked out with ſmall wooden pins.

The young farmer need only be told farther, that all ſudden floods, of ſhort duration, are greatly beneficial to graſs lands, as they convey and depoſit matter of great fertility upon the grounds they ſo viſit. But theſe differ widely from the preſent grievous continued inundations. I heartily wiſh theſe hints may prove uſeful, and am, with compliments to —— for the honour he does me,

SIR,

Your obliged humble ſervant,

JOHN STEVENSON.

BOOK

BOOK VII. PART II.

Of the cultivation of artificial graſſes.

CHAP. XIII.

Of artificial graſſes in general.

THESE are principally of foreign origin, and all of them are to be ſown and raiſed by culture.

The method of culture has been alſo copied from abroad, but we have greatly improved it. 'Tis the character of the Engliſh to receive and adopt the productions of other countries, and to make them our own by improvement. We have in no article done it more than in this of the foreign graſſes.

There are many reaſons to take a piece of ground out of corn, and ſow it with graſs. This uſed to be done in the old huſbandry, with common graſs ſeed, but at preſent the cuſtom is by ſome of theſe, and the profit four, five, or more times greater.

There are great reaſons for varying a crop from time to time. And theſe anſwer excellently for that purpoſe, giving the land an advantageous kind of fallow, while they afford a profitable produce.

The huſbandman ſees often the advantage of ſowing corn or pulſe, where graſs would hardly grow, but this is raiſed at an expence of manure and tillage, and laſts no longer than one ſeaſon: theſe graſſes will grow, with proper management, on ſuch ground as will not bear common graſs; and they will alſo follow corn when it has quite exhauſted the land.

Corn rooting ſlightly, can exhauſt only the ſuperficial part of the ſoil, ſo that theſe which go deeper find nouriſhment: and at the ſame time fallow and improve the upper part, which will be wanted for corn again.

The pulſe kind are all improvers of land by this means; by ſhading the ſurface and mellowing it, while they draw but little nouriſhment: but theſe graſſes do much better, they cover the ſurface more cloſely, ſo that there is more advantage to the ground, and they penetrate deep for their nouriſhment. They differ from pulſe in this, that they require a great deal of food, but then they take it from ſuch part of the ground as is not called upon for culture.

Every thing that enriches land acts upon one of theſe two principles, as manure or as fallow. The manure gives a fertility from themſelves. The fallow leaves the ground open to receive it from the air: but it will get it any where ſo it have reſt.

In gardening, when much manure is not uſed, the ground is to be trenched once in two or three years, to make it fruitful. This trenching is changing that part on which plants ſtood, and from which they received nouriſhment. They dig to a depth ſufficient to raiſe a new parcel of mould; and they bury the former ſurface in the hollow from whence they throw up that. In the ſame manner theſe graſſes act, though under a different form, and every way more ſucceſsfully. In that caſe the ſuperficial earth is thrown under the new ſurface, where it gathers freſh ſtrength, and will be fit to nouriſh crops again. In this method of the graſſes, that under part, inſtead of being thrown up, is exhauſted by plants, whoſe roots go down to it; and the upper part lies at reſt, or with very little demand of nouriſhment from it. It is all the time ſheltered by the ſpreading branches of the crop, and enriched by the dews and rains; and occaſionally by the dung of cattle.

CHAP. XIV.

Of clover, its moſt proper ſoils, and the manner of ſowing.

WHEN we ſpoke of the artificial graſſes, as the product of other countries, we made a reſerve in favour of clover, ſaying only, they were ſo in general. As to this in particular, it agrees in the manner of raiſing and cultivating with the reſt; and we have the ſeed of ſome kinds from abroad; but it is in its origin a native of our own country. The common red trefoil, vulgarly called red honey ſuckle, is wild clover, and there is no other difference between that and what we raiſe by culture, but what the richer ſoil and addition of dreſſings has made.

Clover, and the artificial graſſes, have not the leaſt reſemblance of graſs, the uſe they ſerve in ſupplying the place of it, has occaſioned their being called by the ſame name.

Clover is a low plant, and naturally leans on the ground. The roots are fibrous, ſome few ſmall ones ſpread under the ſurface, but the greater part penetrate down. To draw up a root from common ground, one would ſuppoſe it did not go down above three inches; in a well manured field, where the earth is light and mellow, the longeſt fibres carefully drawn, will meaſure about ſix inches; but they may be traced with care to fifteen or eighteen; and do really penetrate much farther; but that they are then very fine, and ſcarce to be diſtinguiſhed.

The ſtalks are numerous, jointed, and ſpreading. The leaves grow from the ſtalk, and many from the root. Each foot ſtalk has three upon it, and they are often ſpotted in the middle. The flowers are red, and ſtand in little tufts at the tops of the branches. They are of the ſhape of the pea bloſſom, but ſmall, narrower, longer, and not ſo open; and the ſeeds are contained in a kind of little pods. There is a drop of a honey-like juice at the bottom of each flower, whence it obtained the vulgar name of honey-ſuckle.

Clover differs according to the degree of culture in bigneſs, and the form of ſpreading or ſtanding more erect. The wild honey-ſuckle, which is common among the graſs of paſtures, is an advantage to it. This is low, and in a great meaſure lies down upon the ground: in fields where it is raiſed from ſeed got from cultivated plants, it is larger and more erect. The leaves are larger, and ſo are the heads of flowers. We have alſo what we call the iron clover, which is very ſweet and ſmaller than this, but it differs no otherwiſe than from the ſame kind of accidents. The Dutch and Flemiſh taught us the uſe of clover, and they raiſe it to a great advantage at this time, the quantities they ſometimes obtain from an acre being too great for the credit of thoſe who have not ſeen their great care and excellent management.

With reſpect to the ſoils the richeſt always ſucceeds beſt with clover, and there is none ſo good but it may be worth while to raiſe this graſs upon it. There is land too rich for corn, for it will make it too rank, but this will excellently nouriſh clover; and on the other hand, it is a bad and ignorant practice to ſow this on poor ground, for it will never come to good.

Whatever would be needful to ſuit ſuch land to corn, the ſame will be neceſſary to make it bring clover to good.

We mean to ſhew what is neceſſary for clover, but we ſhall inform the farmer, that in the common courſe of things it is not to be ſown on rich land new broke up; or on ſuch as has been dreſſed and prepared purpoſely; but is to follow corn, and will then ſerve in the double capacity of yielding a rich crop, and preparing the land for corn again.

The beſt ſoil for clover is a light, warm, and rich earth. Such as is principally what we call mellow earth, but with a portion of ſomewhat loamy, for otherwiſe pure mellow earth alone is apt to lie too heavy for clover.

A rich loam is an excellent natural ſoil for it.

The land deſigned for clover muſt be brought into good tillage, and for this reaſon it very well follows corn, as it then comes upon a land which has been well wrought, and with reſpect to the nouriſhment this plant requires, is not exhauſted.

If the farmer ſhould chuſe to break up a piece of ground on purpoſe for clover, the freſhneſs of it will make that growth ſucceed, though in its nature it ſhould be improper. As to other ſoils different from thoſe we have named, if the farmer finds it convenient to uſe clover upon them, he muſt manure them accordingly. Marle, dung, lime, or the like, which are uſed to prepare land for corn, are alſo proper in this caſe for clover.

The common cuſtom of ſowing it with corn is liable to objections, but they may be got over by a proper management; and then this will be found a profitable method.

Nothing is more common than ſowing clover with barley, in which caſe it is apt ſometimes to over-power the barley in its firſt growth, and will do great damage. In a wet ſummer the clover will grow at a great rate, and the injury of the barley will be very great this way: on the other hand, in a very dry ſummer it is too apt to fail.

To prevent the damage of the barley by the growth of the clover, the beſt way is, though they are ſown on the ſame ground, not to ſow them at the ſame time. Let him ſow barley alone in the uſual manner, and wait till it is three inches high above the ground: then let him ſow his clover by means of a hand drill. This will anſwer the purpoſe extreamly well. The clover will do better than when the ſeed is ſcattered at random; and not the leaſt damage will be done the barley, by drawing the drill through the field, the perſon entruſted with the work being tolerably careful.

In this way the barley will have got ſo much head before the clover ſhoots, that it will be too ſtrong to be over-powered by it; and at the ſame time, if the ſeaſon prove dry, it will be high enough to defend the clover.

We have ſaid clover may be ſown alone, but when it is judged more proper to ſow it with another crop, barley is not the only kind: it may very well be ſown with oats.

When a crop of any corn is to have clover among it, leſs ſeed ſhould be uſed than if it were to grow alone: and as to the manner of ſowing it, if that be done by hand with the corn, there ſhould be choſen a fine mild day for the purpoſe; becauſe the ſeed is ſo light that otherwiſe it would be blown about, and left on the ground in an irregular manner. The beſt way by far is the drilling it in afterwards.

The time of ſowing muſt depend upon that of the corn with which it is to grow. The little time after is very well worth waiting, for though it keep the clover back, it brings the corn forward. If the farmer be deſirous of having a crop of clover early in the ground, though ſown with corn, the beſt method is to ſow it with black oats, and get them in as early as poſſible.

The ſpring corns are not the only kinds among which clover may be ſown. It will thrive very well with wheat and winter rye, if ſown with them in the beginning of October. There are advantages attending this method, that are to be had by no other. A dry ſummer hurts a crop of young clover extreamly. There is no plant that more requires rain in the time of its firſt ſhooting. It is for this reaſon when ſown very early with black oats it always thrives, becauſe it has the advantage of the rains of ſpring. When it is ſown in the beginning of winter, with wheat or rye, it fares ſtill better, for it is ſure to have a long time of wet, before there will be any ſun or drought to hurt it. In this caſe alſo it ſtrengthens itſelf in the ground extreamly, and is always found thick and flouriſhing on the reaping of the corn.

Some might fancy that a thick crop of clover growing among wheat, would impoveriſh that grain, becauſe of the great quantity of nouriſhment it requires; but they do not interfere with one another, the wheat rooting ſuperficially, and the clover more deep.

When clover is ſown alone October is the beſt time, though ſpring be commonly choſen. Very ſevere weather may hurt it, as it will almoſt any thing; but clover being a native of our country, is not a very tender plant: if the winter be tolerably mild it will make vigorous ſhoots, and ſtrengthen itſelf in ſuch a manner in the ground, as to yield an early and very plentiful crop in the ſucceeding ſummer; after which it will continue firm in the ground, and encreaſing in value. There is this particular advantage in ſowing clover in October, that it comes up free from weeds, whereas in ſpring they riſe in abundance among it, and many of them being of quicker growth will over-power it.

Some, when they are about to lay down a piece of corn land for graſs, chuſe to ſow it with ray graſs and clover mix'd: but the beſt method is to ſow them at different times, though they are to grow together afterwards: the beſt corn for ſowing with ray graſs and clover is wheat, and the beſt way of doing it is thus. The wheat being ſown at its natural time, let the ſeed of the ray graſs be ſown with it and the clover the following ſpring. This muſt be done early, that the clover may, during its firſt growth, have the advantage of the ſpring rains, and be got to an height in ſummer.

There is, in the common way of huſbandry, another reaſon for ſowing it very early in the ſpring in this caſe, which is, that nothing more can be done as to the covering it at that ſeaſon, but rolling the field: now rolling, while the corn is very young, will help it; but if it ſhould be done when it has got into ſtalk, it will hurt that crop extreamly by breaking the ſtems, which difficultly recover ſuch an injury, after they have arrived at any ſtrength. This we have explained at large in a preceding part, under the article of rolling.

When the farmer thus ſows two graſſes with wheat, he is to let in the laſt in the ſame manner as with the barley, if he will follow the moſt reaſonable practice. Let him ſow ray graſs with the wheat in October; but when he comes in ſpring to ſow his clover, let it not be done by hand, but by the hand drill, and ſow the clover we have directed when it is to grow with barley.

The damage the ſevereſt winter can do clover, is not ſo great as that of a dry ſummer to ſuch as has been ſown late in ſpring. If the roots be tolerably covered, and the ſoil lie any thing cloſe about them, they will get no harm. When the farmer finds danger of the winter, with reſpect to a young crop of clover that is alone, his beſt method is to turn in his ſheep to eat it before the ſevere ſeaſon. The leaves and ſtalks which would have been deſtroyed by the froſts, will have anſwered their purpoſe; and the root being better ſecured than before, by the trampling of the cattle, which fixes the ground about it, will ſtand perfectly well: having no head to ſupport during the winter, it will ſend up its leaves and ſtalks vigorouſly in ſpring.

The huſbandman is to conſider next the nature and quality of the ſeed; to chuſe ſuch as is new, and of a good kind. Among the ſeveral quantities of clover ſeed offered to ſale, there is a great deal of variety of colour; ſome is yellowiſh, ſome rediſh, and ſome blackiſh. The yellowiſh is the beſt, and to have the true tint, this ſhould be a greeniſh yellow; the rediſh is the next good colour, that which is black is worſt.

It ſhould be clean, large, and gloſſy on the ſurface, which is always a proof of its goodneſs, as a duſty heavy aſpect ſhews it has been damp, or has had inſects in it. The next conſideration is the quantity; about this there is much diſpute, ſome ſay ſix pound is enough for an acre, others uſe twelve or fourteen.

The general practice is wrong in allowing too much ſeed; but thoſe who uſe this ſmalleſt quantity err on the other ſide: ſix pounds is too little. Clover never grows to any conſiderable ſize; it is but ſmall in compariſon of other of the artificial graſſes, therefore the plants are not to be kept at that diſtance which the others may be with advantage. Eight pounds of good ſeed is as little as ſhould be allowed to an acre in any condition; and thoſe who go beyond ten, allow what is ſuperfluous. Nine pound may be called a good quantity: the largeſt quantities yield not only the ſmalleſt, but the worſt crops.

Many of thoſe who have written on this ſubject ſay, that a very large quantity of ſeed will yield him ſo much the larger crop. This has been the general error.

CHAP. XV.

Of the feeding cattle on freſh clover.

THERE are two uſes for which clover is ſown; the feeding cattle upon it as it grows; and the laying it up for mowing, for hay: in this it reſembles the natural graſs, and anſwers both theſe purpoſes in the ſame beneficial manner. But there muſt be care in the feeding it on the ground.

The richeſt foods on our own tables are capable of doing us the moſt harm. They will often breed diſtempers in us, and cattle are no more exempt from theſe than we are.

Clover is a very rich food for them, and they are ſo fond of it, as to eat of it often immoderately; wherefore unleſs care be taken, eſpecially when the clover is rich, and they are ſuddenly turned into it, they will get diſorders. An acre of clover will, on a moderate computation, feed as many cattle as ſix acres of the common run of paſture grounds: but, in order to make the moſt of it, they ſhould not be turned into the field to trample it down at random: it ſhould be mowed freſh as it is wanted, and given them green in racks.

Cattle being turned at random into freſh clover, will eat of it till they burſt. It is beſt to feed them with it freſh mown, in proper quantities firſt, that they may be uſed to it, before they are turned in to take their fill. The novelty of the taſte recommends it, and they are like children in the ſhop of a grocer, whoſe only danger is till they are uſed to the ſweet things; after which they will not eat to hurt themſelves.

Some conſideration muſt be had as to the ſtate of the cattle: for ſome will bear a rich nouriſhment better than others. As for ſuch as ſeem moſt likely to receive miſchief, the beſt way is to give them ſtraw with it at firſt.

When they are firſt turned into the field of clover, it ſhould be done gradually.

The right method is firſt to turn them in about the middle of a hot day, when they have eat before, and the leaves of the clover are a little flagged. The great danger of this food is, when eaten in too great quantities, and when the dew is upon it; therefore care being taken as to the dryneſs of the clover, the next article is the not ſuffering them to eat too much. They ſhould be ſuffered to be in the clover but half an hour the firſt day; the next day they ſhould be turned in at the ſame time, and left an hour, and ſo on till they are accuſtomed to it: this we have obſerved generally before, ſpeaking of the horſe and its food: but it is proper to be more particular here.

Some regard is to be had to the weather; for experience ſhews, clover is apt to damage horſes in wet ſeaſons, and much leſs ſo in dry.

It is for the good of the clover, as well as of the cattle, to keep them off in wet weather: their feet are apt to do a great deal of harm at any time, but they will do moſt when the ground is damp.

The addition of ray graſs to clover is advantageous in all reſpects, and in none more than this of health to the cattle that feed upon it. Ray graſs is more of the nature of the common and natural graſs of our paſtures, which is their proper food; therefore being mixed with the other, it tends to correct its richneſs; and, in ſome degree, anſwers the purpoſe of ſtraw, which we have ſaid is proper to be mixed with it. At the ſame time that it renders it more wholeſome, it increaſes the crop in quantity, for this ſpreads under the ſurface at the root; whereas the clover penetrates down deep, ſo that they grow as well together as the corn and the clover; and the quantity is vaſtly increaſed upon the ground; for the leaves grow together as naturally and as well as the roots, ſtanding no more in one another's way than they do. The clover ſpreads in an open looſe manner, and its branches ſhelter the ground where the roots of the ray graſs ſtand, ſo that it is moiſt and full of nouriſhment: in the mean time, the narrow ſlender leaves of the ray graſs riſe up and appear through the clover, without any difficulty. Both grow together; and are fit to be mowed together for drying, or to eat together on the ground: but there is this caution to be given the farmer, that clover and ray graſs do not prepare the land for corn any thing nearly ſo well as clover alone. A crop of clover improves the ground, by ſheltering the ſuperficial part, and drawing its nouriſhment from ſome depth; but ray graſs roots ſhallow as corn does, and therefore the ground is, in ſome degree, exhauſted where the corn is to get its nouriſhment.

We do not ſpeak this ſo abſolutely as if ray graſs was never to be mixed with clover, where corn is to come afterwards. The farmer will know by this, that, in general, clover alone is proper to be ſown where the land is ſoon to bear corn again; but, on the contrary, when it is intended to lie longer in graſs, then clover and ray graſs together. When ray graſs is mixed with clover, where corn is to follow ſoon, the quantity of the ray graſs muſt be ſmall; whereas when the ground is to lie long in graſs, the quantity of the ray ſhould be large.

Cows are ſubject to diſorders from clover; and when it does not take this effect, it injures their milk in flavour, and is prejudicial to the dairy. This is greatly abated by mixing ray graſs in ſowing, for this being nearer the natural provender of the cow, takes leſs effect upon her than with the other. The common graſs of our paſtures has frequently the wild clover among it; ſo that there is no other difference between a field of clover and ray graſs, and one of our common paſtures, where there is a large ſhare of honey-ſuckle trefoil; but that the one is a mixture of graſs and clover, in which the graſs has the larger proportion; and the other is a mixture of the ſame things, in which the clover has the largeſt part.

Clover, though it is a much more laſting crop than any of the pulſe kind, which are ſown for the ſame purpoſe of improving the ground, yet is but of a certain duration, and that not equal to ſaintfoine, or ſome other of the artificial graſſes. Clover will laſt well enough three years; but after that it declines ſo greatly, that it is not worth continuing upon the ground. Therefore the farmer at the end of three years, muſt, in the common courſe of his practice, plow up the land again: if he deſign it for a different crop, he will find it very well improved; if he intend to continue the clover longer upon it, he muſt ſow a freſh parcel after good plowing, as he did the firſt, and it will ſtand three years more in the ſame manner.

The common practice requires this; but it does not follow, that the thing is in itſelf abſolutely neceſſary. For it might be much otherwiſe in another manner of managing the crop.

On certain occaſions, common graſs requires its year of reſt; and, if clover on the third year were not to be mowed, but only eaten, it is probable it would recover itſelf ſo as to laſt longer. It is an experiment worthy to be made.

The Dutch were the inventers of cutting clover green, and giving it to cattle in the racks: beſide its not ſubjecting them to diſorders, there is a great deal of frugality in this management.

Where clover was given in this way to larger cattle, it was diſcovered hogs are fond of it: this led to the trying them with clover; and it has been found an excellent food. Some have propoſed extravagant profits from this; but without truſting to ſuch calculations there may be great advantage in it.

Feeding cows on clover would be more regarded, were it not found to give a taſte to the milk. The farmer when he ſees an inconvenience, is not to ſuppoſe it can never be remedied. The cure is eaſy, it is only the not letting them feed entirely upon the clover. The natural food of the cow is common graſs; the clover ſhould not be given alone. When the ray graſs is mixed with clover it is more proper for cows, but the beſt method is to feed them in clover during the day, and turn them into a common paſture at night: the milk is thus rendered abundant by the clover, and is kept to its common taſte by the other graſs.

When hogs are turned looſe into a clover field, they deſtroy and taint it with their dung and urine, after which they will not eat it freely. This is ſo great a diſadvantage, that I have ſeen where hogs have throve extreamly upon it for a time, they have afterwards pined away. It is not that the clover does not agree with them, but that they have ſpoiled it, and don't like it any longer in that condition. Feeding them with it properly, it would be an excellent improvement upon the common methods in that reſpect.

Sheep are alſo fed advantageouſly with clover: they will eat it freſh, or in hay; and it is of vaſt ſervice in the breeding up of houſe lambs. The ewes feed on it in ſummer in the field, and in winter on the hay under cover; and there is no food that ſupplies them with ſuch plenty of milk.

The farmer will find this a vaſt article in feeding of his horſes in ſummer and winter; the graſs and hay being equally proper, under a right management. Sheep, and graſs lambs will alſo very well fatten upon it; and the ſtore ſheep may be ſupported on it during ſummer.

Some have ſowed clover with peaſe, and others with horſe beans. The peaſe are apt to ſpoil the clover; but there are occaſions in which it is proper. The beans, as they do not lie upon the ground, are not liable to the ſame objection; but the preparation of the land for beans being leſs than for peaſe, and the clover requiring a very well tilled ground; this does not ſucceed ſo well. When the change of crops renders it neceſſary, theſe things may be done; and ſome time may be ſaved by a crop of clover, in which the ground otherwiſe would be idle; but theſe are accidental conſiderations. The proper and profitable methods are thoſe we have directed in ſpeaking of that article; either with clover alone, with ray graſs in the common method, with barley or oats, or with wheat.

CHAP. XVI.

Of the mowing of clover, and its hay.

THE growth of clover is ſo ſtrong, that it may, where circumſtances ſuit, be mowed more than once in the year.

The firſt time is toward the end of May. The root has been well ſtrengthened in the ground; and the ſhoots are numerous and ſtrong. The farmer is to look well upon it for the proper ſeaſon, for it is not in the nature of theſe things to allot any certain day of the month. It is a particular condition of the plant that gives the rule for mowing, and this may happen according to the ſoil, ſeaſon, and other accidents forwarder one year, and backwarder another; and earlier in one crop, and later in another the ſame year.

The latter end of May is the uſual time of clovers firſt coming fit for cutting, but it may be ſooner. He ſhould begin to look upon it in the middle of May; and obſerve in what condition it is with reſpect of flowering. The time when clover is fitteſt to be cut for hay, is juſt when it is getting into flower, the leaves and ſtalks of all plants are then fulleſt of virtue.

The flowers of clover grow in ſmall tufts, or roundiſh heads, at the tops of the branches, in form of green, hairy buttons, ſome time before the flowers begin to open. The farmer is to watch the appearance of theſe, and to obſerve how they gradually come toward ripeneſs; and he is to ſend in his mowers juſt before they begin generally to blow. A few will make a ſhew here and there in the field, while the reſt are exactly in their right condition; for there is no plant, a whole field of which gets into flower all together. This is his time, when all the plants are full of heads, and ſome few of them only have begun to open into flowers. Several have erred in letting the clover ſtand too long for the firſt mowing; and they think ſtill in many places, they ought to ſee it in full flower all over the field before they begin.

The intent of the farmer is, firſt, to get a crop of rich hay, and next to have his clover roots in a ſtrong and vigorous condition; for their ſhooting quickly afterwards, is a thing of great conſequence.

The time when his hay will be beſt, is when it is thus juſt getting into flower, and this is a time at which it has not exhauſted the roots. If it be cut juſt at that period, the roots having loſt the large head they had to ſupport, will puſh out their ſhoots with a ſurprizing ſtrength; but if the plant have been ſuffered to ſtand till all of it be in full flower, and ſome getting into ſeed, which happens very ſoon afterwards; the ſtore of nouriſhment that has been called up, has, in a great degree, exhauſted the roots, and they will grow poorly afterwards for ſome time.

Therefore as ſoon as all the plants are knotted, or have the heads formed at the end of their branches, let the crop be cut; and let the mowers have caution to cut it as even as poſſible, for this greatly forwards the growth of the new ſhoots. When cut, it is to be managed exactly as common graſs, and ſo made into a dry, firm, and ſound hay. The farmers muſt not be ſurprized at clovers ſhrinking in the drying, for that it always does in a very particular manner, its branches falling together, and the whole getting into a very ſmall compaſs.

Care is to be taken thoroughly to dry this, becauſe having a great deal of natural moiſture, it will otherwiſe be ready to become damp afterwards, and by that means to decay. Being cut at this proper growth, and carefully managed in the making, it will be an extreamly rich and wholeſome food for the fattening all kinds of cattle. When it has ſtood too long upon the ground before cutting, the hay is too rank, and has not the excellent qualities of this firſt crop when made in perfection.

After mowing this crop the land is to reſt, and occaſionally it may be mowed again once, toward the end of ſummer, or twice: the former time in July, and the other toward autumn. There may be reaſon for cutting three crops of clover; for different farms are circumſtanced variouſly; but to ſpeak in general, it is not what the huſbandman ought to make the rule of his practice. Very often when three crops are cut, there is not weather for making the laſt tolerably, for the clover requires good weather, more than common graſs, becauſe of its juicy nature. When the ſeaſon favours, the ſecond crop impoveriſhes the third, and ſeldom gives it time to ripen.

In the common run of things the advice that is moſt profitably to be followed, is to make but two crops of clover hay; and this is very material, when one of them is intended for getting of ſeed, which is very proper: in this caſe there requires a time for the laſt crop to ripen thoroughly, which it will rarely do when two have been cut before.

We ſhall ſuppoſe the laſt crop of clover in the ſummer, to be intended for ſeed; and in this caſe it muſt ſtand a good while. The owner muſt look in upon it from time to time; and watch the ſeaſon of its ſeed being ripe. He muſt wait this with patience; and he may wait without fear, for this is not one of thoſe crops, the ſeeds of which are apt to ſhed.

If clover have been well managed, the ſeeds will begin to appear in the huſks toward the end of Auguſt, ſooner or later, according to the ſoil, ſeaſon, and manner of ſowing: from this time it will take between three weeks and a month to be thoroughly ripe: and when it is in that condition the ſtalk will begin to grow brown. This is the caſe in all plants, and this is the time for mowing it. When the ſtalks are brown or yellow, and on opening the huſks the ſeed is found to be yellowiſh, the full time of cutting it is come, then the farmer is to take the advantage of a good dry day, and get it down. It is then to be made with care into hay, but this does not require all that length of time that a crop does when the ſtalks and leaves are fuller of juice. When dried it is to be laid up, and to be kept in the ſtraw in ſpring.

Toward the latter end of March it is to be thraſhed and ſeparated from the ſtraw. After this the huſky part is to be well dried in the ſun, and thraſhed again; after this ſecond thraſhing it ſhould be ſpread for a farther drying, and then worked about with rakes, and rubbed thoroughly in the hands, and by this means a great deal more ſeed may be got out of it.

By the difficulty that the farmer will find in getting the ſeed of clover clean, he will learn not to be afraid of letting it ſtand in the field till thoroughly ripe, for otherwiſe it will never ſeparate tolerably; and he may be ſure there is no great fear of waſte, in a ſeed that is thus unwilling to leave the huſk at any rate.

Two buſhels of good ſeed will generally be had from an acre: but it is the niceſt affair in all thraſhing, ſo that the farmer muſt ſee to get a perſon who underſtands it; ſuch a one will do four times the buſineſs of another.

The difficulty of getting the clover ſeed clean from the chaff, has induced ſome to prefer ſowing it in the huſk, and there is no great danger of its ſucceeding, provided it can be diſtributed properly on the ground; but as the wind is apt to have too much power upon clover ſeed, in the common way of ſowing it, when it is clean, it muſt have more this way, and there will be danger of its blowing into heaps in ſome places, and leaving others vacant.

This objection is only of force againſt the common way of ſowing: where that is done by the hand drill, as we have adviſed in the ſowing clover with barley, it may as well be uſed huſk and all, for it may be laid in with the ſame regularity as if naked.

The ſeed of clover of the firſt year is better than any other, but it will grow very well the ſecond: after this it is hazardous truſting it, a great deal of the ſeed miſcarrying.

CHAP. XVII.

Of the ſoil for ſaintfoin, and its growth.

TWO articles give ſaintfoin the preference over clover; its larger ſize and its longer continuance in the ground. Clover laſts properly but three years, ſaintfoin will laſt four times as long; or more than that if neceſſary. In order to keep clover a little longer upon the ground without freſh ſowing, the ſecond crop muſt be given up as to mowing; it muſt ſtand to ſeed: and when the ſeeds have ſcattered themſelves, ſheep muſt be turned in to feed. This is a method attended with evident diſadvantages, and is often inconvenient: ſaintfoin requires no ſuch management. Let a ground be once well covered with it, and it will take care of itſelf afterwards; when it is thought fit to plow up the land, corn thrives excellently upon it: the method of doing this, we have ſhewn already.

Any ſoil will do except chalk: on very poor, ſtony, and ſandy grounds it will do very well: and though it be a plant that naturally roots very deep, yet it will thrive where the mould is but ſhallow: its deep rooting is a great advantage where there is compaſs: for this makes the leaves of ſaintfoin look freſh, and ſerve excellently for cattle; when all others are parched with a drought in hot ſummers. The ſun can take no effect upon a root that goes ſo deep; and it always finds nouriſhment there, while the ſuperficial mould in which clover, and ſuch other things are rooted, is ſcorched and dried up.

Saintfoin is an excellent crop any where, but it will anſwer beſt of all in thoſe places where manure is ſcarce: it may therefore be conſidered as one of the beſt crops the farmers in the remote counties can take into their hands. They need not be afraid of a ſtony bottom under the ſhallow mould in theſe places, as that is a common condition of much of the land there, for the ſaintfoin will puſh its roots through the cracks that there always are in beds of ſtone near the ſurface, and by that means find nouriſhment lower.

CHAP. XVIII.

Of ſowing ſaintfoin, and managing it while on the ground.

SAINTFOIN ſo far partakes of the nature of clover, that it may be ſown either alone or with corn; or it may be ſown entire, or with a mixture of ray graſs. This latter method is not of that advantage that it is in the caſe of clover, for ſaintfoin is very well able to fill a land alone, and it has not the inconveniences that attend clover, in diſordering the cattle which feed upon it.

The moſt uſual way at preſent is, to ſow ſaintfoin with barley, and this in the common method of huſbandry, is a very ſucceſsful practice. Let the ground be plowed three times, to get it into a very fine condition; for as clover requires this, in order to produce a tolerable crop, ſaintfoin renders it more neceſſary; and it is very well worth while, becauſe of the long time this plant will laſt.

The land being broken by tillage, ſhould be manured with mellow dung, or ſome of the richer additions in a ſmall quantity, as ſoot; than which nothing is better. This done the barley is to be ſown, and after it is harrowed in, the ſaintfoin is to be ſown by the broad caſt-way. But let the perſon who does it have a caution given him, to ſcatter the ſeed very thin, and ſow it twice in a place. This is the only way of raiſing a crop of ſaintfoin according to the common methods, with any tolerable degree of regularity. When ſown, the ground is to be harrowed lightly over, and nothing more is to be done till the time of rolling the barley, which is alſo of great uſe to the ſaintfoin

Thoſe who ſow ſaintfoin with oats muſt uſe the ſame general method as with barley, but the former is always the better.

Saintfoin may be ſown alone in ſpring; but that is not the beſt practice. It may as well be got into the ground the October before, and by this means there will be a crop of it a year ſooner than there would be in the common way. The choice of the ſeed depends upon the ſame particulars as that of clover, it ſhould be clean, heavy, dry, and of a ſhining ſurface. The freer from huſks the better.

The difference in reſpect of the quantity of ſeed to be allowed in this, and in the drill huſbandry, is very conſiderable: five or ſix buſhels are commonly allowed in this way of the broad caſt ſowing, to an acre, and leſs than four is not ſufficient; the other is rather too much. When ray graſs is ſown with ſaintfoin, the general proportion is five buſhels of ſaintfoin ſeed, and one buſhel of the ray graſs to the acre.

When ſaintfoin is ſown alone, if the weather be dry at the time of its coming up, 'tis very apt to take a ſtint in the growth, from which it is a long time recovering; this may be prevented by watering it by means of a cart, with a convenience behind pierced with holes. In the new method of huſbandry this would be eaſy; and it has been practiſed in the common way with very good ſucceſs.

When ſaintfoin is ſown in ſpring with barley or oats, the ſooner it is got into the ground the better.

In a ſucceeding chapter we ſhall treat of mowing ſaintfoin for hay; but here we are to conſider the beſt method of feeding of cattle upon it while on the ground. This is a very profitable practice, but it requires ſome management. The cattle are not ſo apt to hurt themſelves with this as with clover, but they may eaſily damage the crop; and when the farmer finds that it is one of thoſe crops calculated for laſting ſeveral years, he will underſtand that it is worth while to guard againſt ſuch accidents.

To know how to do this beſt, he muſt acquaint himſelf with the nature of the plant. Saintfoin is very ſtrong and hardy, and is not eaſily injured when it is well eſtabliſhed in the ground; but at firſt it is very eaſy; eſpecially at the top of the root, where the damage is not readily recovered.

Let the farmer be tender of his ſaintfoin the firſt year. The moſt likely methods of hurting it would be the putting large cattle into the ground while the plant is young, for its ſweetneſs will tempt them to eat it down cloſe, and by that means they will hurt the head of the root; and at the ſame time their feet would increaſe the miſchief by treading of it down.

If the farmer finds it needful to put any of his cattle into a ſaintfoin ground the firſt year, ſheep are moſt profitable; but it is beſt to omit this entirely.

The beſt method is to mow it the firſt year, cautioning the ſcythemen to be very regular in their work, and not to come too cloſe to the root: the next year ſheep may very well be fed upon it; and after this it will have got ſo much ſtrength that it may, without hazard, be uſed according to the farmer's circumſtances and diſcretion in feeding and mowing.

We have named twelve years as a time during which ſaintfoin continues very good and ſtrong; but in this all that is to be done is ſpeaking generally and in round numbers, for according to the nature of the ground, and the uſage the crop has received, it will in ſome places be worn out ſooner, and in ſome it will laſt twice that time.

When worn out it may be plowed up and ſown again, or another piece of ground found for that purpoſe, and corn ſown on this: but it may alſo be refreſhed by manures. Of theſe none anſwers the purpoſe ſo well as marle. A tolerable quantity of this ſpread over a decaying piece of ſaintfoin, will renew it for ſeveral years; and there are circumſtances under which this may be very well worth while. Rotten dung may be uſed for the ſame purpoſe, or ſoot.

Feeding upon the ſaintfoin is an excellent thing for cattle: it is full of a rich nouriſhment, and yet is not rank. It fattens them, without breeding diſorders. Spring is the ſeaſon when it beſt anſwers this purpoſe freſh; and this is moſt convenient to the farmer: the only caution is not to put heavy cattle upon it in wet weather: in any other ſeaſon, when the crop is well eſtabliſhed, they will not be able to hurt it.

Autumn and winter are the moſt proper times for ſheep: this alſo very well anſwers the farmer's purpoſe. The great ſhoot of the ſpring is ſufficient for cows and oxen, and the crop recovers itſelf for one mowing, after which there grows a young ſhoot that ſerves very well for ſheep, at a time when they want it; and they neither damage it by their cloſe eating, nor heavy treading. No food fattens ſheep ſo freely or ſo ſuddenly at that ſeaſon, and none is better for oxen in ſpring, or for milch cows, when eaten upon the ground, or green in the rack: it cauſes abundance of milk, and does not give it that ſtrong and particular flavour which it has from the feeding on clover.

Theſe general cautions muſt be enlarged or retrenched, according to the ſoil and other accidents. In a dry ſoil and dry ſeaſon large cattle may be turned in upon the growing crop, earlier than we have ſaid; and in a moiſt ſoil they muſt be kept out later. Nothing eſtabliſhes itſelf more firmly in the ground, giving it time; but when it is trampled young, in a damp ground and wet ſeaſon, it is damaged in ſuch a manner, as never to recover.

CHAP. XIX.

Of mowing of ſaintfoin, and the uſes of its hay.

AS freſh ſaintfoin is excellent for horned cattle, the hay is one of the beſt known foods for horſes. There is a particular management required in keeping the ground for hay, but it is ſo like that uſed for clover, and indeed for natural graſs, that the farmer will need few words to explain it.

To have a crop of hay of any ſpecies, the ground muſt be laid up a proper time. The time for laying up ſaintfoin is the latter part of March, and two months will bring it into a condition for mowing.

Saintfoin is to be mowed like clover juſt when it gets to flower, only the ſaintfoin may be allowed to ſtand till a little forward in bloom: it muſt not be ſuffered to remain till the bloom begins to fade, and the ſeeds to be formed. In clover the greateſt benefit riſes from cutting it juſt when the heads are all formed, and but few of them have opened; in ſaintfoin the exact time is when a good number of the flowers have opened, but none are faded.

It is to be made into hay, by frequent and careful turning: it requires more care and pains than common hay, but not ſo much as clover; the leaves and ſtalks not being ſo juicy.

The propagating ſaintfoin for its hay, is of great importance to farmers, in many of our corn counties, for the nature of their land in many places is throughout ill adapted to paſturage; and the profits from corn are ſo great, that little is uſed for that purpoſe in others. In ſome places this is carried to ſuch a height, that there are large farms in thoſe parts of the kingdom that have ſome very little, and others no land of the common paſture kind, ſo that the people who occupy them can ſcarce keep any cows in moſt, and in ſome find it very difficult and expenſive to ſupport their horſes. The introducing of ſaintfoin muſt be a thing of great convenience to theſe: it is bringing in a crop that will be managed with eaſe in their own way, will grow on the common run of their grounds, and will come in the natural courſe of their tillage: and this will feed their horſes and other cattle, and if they chuſe to cultivate more of it will bring them a great profit at the market.

A field of ſaintfoin will, in ſuch a caſe, make a prodigious change in the farmer's affairs. He may feed cows, if he have ground near home, with freſh cut ſaintfoin during the whole ſummer, under cover in racks; and in autumn and winter he may turn them in to the aftermath of it, only obſerving to favour the ground in wet weather. When winter is advanced he may turn in his ſheep; and then feed the cows under cover again, with the hay cut at the midſummer mowing, and in ſpring turn them into the freſh growth of it again. This is a prodigious thing in counties where natural graſs is ſcarce; the farmer in theſe places uſed to be confined to the ſingle article of his buſineſs reſpecting tillage, and the growth of corn; but by the introducing this plant, he is able to undertake the whole, and ſhare the advantages of thoſe more happily ſituated, part of whoſe land falls out naturally for paſturage, part for corn; and who find it eaſy to keep up ſuch a proportion, as makes them mutually ſubſervient to one another.

CHAP. XX.

Of lucerne, its ſoil, and the manner of ſowing it.

LUCERNE is one of thoſe plants we have introduced from abroad.

It is one of thoſe which ſerve in the place of natural graſs, and are therefore called artificial ones. We have ſaid the leſs of ſaintfoin in this place, becauſe it had been treated of before. Lucerne having not been mentioned yet, we are to conſider it here at large.

It is a pretty looking plant, with blue flowers. The root is long, and of conſiderable thickneſs. The ſtalks are firm, upright, and branched; they have great numbers of leaves growing three on each footſtalk; and the flowers ſtand in little heads, followed by a kind of twiſted pods.

It anſwers the purpoſes of ſaintfoin, and endures many years.

We had it from France; but the Romans have written of it; and by the labour and expence they employed in its culture, it is plain they were acquainted with its value. They called it MEDICA, and we find frequent mention of it in all their writers, who treat of agriculture. They preferred it before all plants as a fodder for cattle; and they had reaſon: nothing excels, and perhaps it would not be too much to ſay, nothing equals it. With this character, which is vouched by the experience of huſbandmen in other countries, and in no part contradicted by the trials made in England, we hope it will become more known, and in time univerſal.

We have ſhewn the great benefit there is in ſaintfoin, and there is the ſame or more in this. The antients have left us accounts concerning its effects in fattening of cattle, hardly to be credited; but the relations the French, among whom it is more commonly cultivated, give of it, and what I have ſeen of ſome raiſed in England, ſeem to give reaſon to believe thoſe relations are not much exaggerated.

It is ſweeter than clover, and has ſo many advantages, and ſo few objections have been raiſed againſt it, that the only reaſon why it has not been more generally introduced, ſeems that its culture is not ſufficiently underſtood. In this there is nothing difficult: we ſhall lay down a method ſupported by ſome experience.

Lucerne will grow on any ſoil. This puts it in every farmer's power to raiſe it. It will thrive beſt on the richeſt; but there is none where it will not be of equal benefit with any other crop.

The antients gave it the beſt natural ſoils they had; they improved theſe with all poſſible care by manure, and tillage: there is no crop for which we dreſs the ground in ſo laborious or expenſive a manner; and it is beyond a doubt, that if we would follow their example in taking a great deal of care of it, and beſtowing a ſufficient expence and labour upon it, we ſhould reap proportionable advantages.

They had not the right knowledge of its moſt advantageous culture; they ſowed it thick: which, by what we ſee, muſt have had a bad effect.

The root of Lucerne being large, is enabled to ſupport a head of numerous ſtalks; and this is the method by which it will be moſt ſerviceable to the farmer. This can only be promoted by its ſtanding at a diſtance one plant from another. On this depend the great profits from Lucerne, and this the antients had not; nor can we have, in the common method; for our farmers have run into the ſame fault: they have ſown it ſo thick, that the plants ſtarved one another.

It is eaſy to ſee, the drill method muſt be fitter for this than the common, becauſe that way the plants will ſtand remote, and will be vigorous: this will alſo be farther promoted by the horſehoeing, in a manner which it can be no way elſe. It is to theſe deep rooted plants, that method of culture is particularly adapted. They ſpread under the ground by large and numerous fibres; and this deep plowing between the rows breaks the earth about them while growing.

The benefit of breaking ground while plants are in it is plain: and by this means it can be done at times during all thoſe years the Lucerne ſtands upon the ground.

This plant, as ſoon as mowed, ſends up new ſhoots in abundance, from the part juſt below, where the ſcythe cut off the top: theſe are much more quick in appearance, and more numerous than in any other field plant; and they furniſh an immediate ſecond crop.

This is greatly to be promoted or retarded by the growth of the plant; which will depend upon its diſtance, and manner of culture. In the common method of huſbandry it is ſet too cloſe to be well nouriſhed: in the other method, the plants ſtand clear, and the hoe plough ſupplies them continually with new ſtores of food. In this way, the ſhooting of a new crop will be almoſt inſtantaneous. The French have introduced this method of huſbandry into their fields of Lucerne, from the writings of Mr. Tull, our countryman; and they boaſt greatly of its ſucceſs. It is a reproach to us that other nations have the advantage of labours undertaken in vain for our ſervice.

From this ſudden and ſtrong ſhooting the lucerne yields many crops: we ſee clover will very indifferently afford them; two is all it can be made to give with full advantage; and from ſaintfoin, the beſt practice is to take but one a year. Lucerne yields ſeven crops a year in the ſouth of France, and all large; and in other places, five or ſix according to the advantage or diſadvantage of ſeaſon or ſituation: in England we may, by the horſehoeing huſbandry, render it capable of producing more than will be eaſily credited by thoſe who have not experience of the nature of this plant, and the effect of that cultivation; but the very advantages of our ſoil and climate, when proper care is not taken, otherwiſe make againſt it.

Wherever lucerne is planted, the greateſt danger is the growth of common graſs amongſt it. Lucerne always declines as this advances; and by that time it comes to ſpread and turf, the crop will be good for nothing.

There is no country where graſs turfs ſooner than in England; therefore no place where a crop of Lucerne would be ſo ſoon over-run and deſtroyed; but then by the drill and horſehoeing huſbandry, it is eaſy to prevent this accident; and that moiſture of the ground, and mild temperature of the air, which would encourage the graſs, will alſo forward the growth of the crop.

The good crops of lucerne in France and Italy, are, in a great meaſure, owing to the ſun drying up the natural graſs: when there happen any conſiderable rains there in ſummer, the crop is poor; with us there never could be expected a good one, if we could not prevent this accident of graſs; but it is plain by the horſehoeing huſbandry we may. People knowing the danger to which it was liable from graſs, have ſowed it thick, that it might ſtarve any that ſhould attempt to riſe among it. The antients followed the ſame practice, and gave the ſame reaſon: with them the error was not of ſo bad conſequence, becauſe they prepared their land richly; but with us it is always deſtructive, for it ſtarves itſelf when ſown thus thick; and being ſtarved, the graſs grows more eaſily among it. We have ſeen many trials made in this manner, and all unſucceſsfully: the natural graſs has grown up among the crop, and the other has proportionably declined; till in a very few ſeaſons a paſture of lucerne has been changed into one of common graſs, with only juſt as much of the right plant as would ſerve to ſhew it once grew there. As lucerne draws its nouriſhment deep, the upper part of the ground will always ſupport graſs; and in England, wherever graſs can be ſupported, it will grow. Nothing but breaking up the ground about it, while growing, can prevent this accident; and no method of culture, but that by the drill and horſehoe, admit this practice. It is plain to reaſon that this method will ſuit lucerne better than any other, but that it never can be raiſed advantageouſly in England any way elſe.

In France and Italy they plow between the rows, where it is leſs needful: and there is double reaſon why we ſhould do it here. In thoſe countries it ſerves but one purpoſe, which is breaking the ground to ſupply nouriſhment; but with us it will anſwer two, the giving nouriſhment to the plants, and deſtroying the graſs.

Our dryeſt ſummers never damage it, when cultivated by the horſehoeing huſbandry; for the dews will ſupply it with nouriſhment, which the earth broken by the hoe, will be ready to detain for its ſervice. The heat of our warmeſt weather will only be ſerviceable to it; and it will find food in the drieſt time, when the ground is open thus to the reception of the dew.

The cold of our winters is not to be feared. Experience ſhews lucerne will thrive where many of the garden plants, that ſtand the winter with us, periſh: if it can bear a colder winter, it will be ſafe from injuries in ours; and from this, and all other conſiderations taken ſeparately firſt, and afterwards together, there is reaſon to believe that England is a country where this plant may be raiſed as advantageouſly, as in any upon the earth: there only requires a proper method of culture.

CHAP. XXI.

Of the moſt proper ſoils for lucerne.

LUCERNE will grow on poor or rich land: at preſent it grows very well in France upon poor ſoils, with no great expence of culture, but under the advantage of the horſehoe: what there is in the ground moſt favourable to it is warmth, and a due depth; what is moſt injurious is a bad bottom. It is eaſy to conceive, that a plant which roots ſo deep, is affected by what lies below the ſurface; and this has been the reaſon why it has failed in ſome parts of England, where graſs has not been very troubleſome. I have ſeen tolerable care uſed about it, and yet it has not throve; and, upon examining, have found under the ſoil a bed of tough clay. This is an under-ſtratum very diſadvantageous to many growths, but to none ſo much as to lucerne; for it detains water about the roots, and at the ſame time chills it; ſo that many of the plants die, and the reſt dwindle away.

As lucerne is a native of a warmer climate, we ſhould give it our warmeſt ſoils. A good loam, with a large portion of ſand, and mellow earth among it, and with very little clay, is the moſt favourable ſoil of all for us. Next to this may be accounted that dry crumbly earth we have in many parts of Buckinghamſhire, which is a compoſition of mellow earth and ſand; after this a warm, and not over-barren gravel is to be preferred; and, laſtly, any ſandy ſoil that has ſome degree of richneſs; for it will not proſper in abſolute ſand.

Of all theſe ſoils the gravelly ſucceeds beſt, in the particular effect of ripening the ſeed; and, in general, ſuch places as are too moiſt from frequent little ſprings are worſt, though their ſoil be ever ſo favourable.

Too much water is deſtructive of this plant in England; whereas in France and Italy, it never ſucceeds ſo well as when near the banks of rivers and ſprings; but there the heats are greater, and it therefore requires more refreſhment. Though we do not recommend that tedious culture, which was given to lucerne of old; yet we ſhall adviſe the farmer who intends to plant it on a poor ſoil, to enrich it with the manures moſt agreeable to its kind. He ſhould thus prepare the ground for the plants; and when they are on it, he may, if he pleaſe, occaſionally refreſh them with a little more.

This doctrine is not agreeable to the ſyſtem of thoſe who would have the uſe of the hoe plow ſuperſede that of dung. We have ſaid already, that no method of culture anſwers ſo well as this for lucerne; nor indeed can it be raiſed beneficially by any other; but we adviſe the aſſiſting this practice with manures for the ſake of frequent crops; theſe depending upon the quick growth of the ſhoot after mowing.

CHAP. XXII.

Of the ſowing of lucerne, and managing it in the ground.

THE antients ſowed lucerne in the beginning of April; at preſent they have two ſeaſons for it, both in Italy and France; the firſt is in March, the latter in October. The Romans erred in ſowing it ſo very late in the ſpring, becauſe there wanted rains, and they were obliged to water it: the preſent practice in thoſe countries is better; and, in general, the October ſowing is moſt profitable; the plants having time to root themſelves well in the winter, and the wet ſeaſon aſſiſting them greatly in their firſt ſhoots.

The difference of climates is ſo great, that it would be very prejudicial to attempt introducing the methods of huſbandry from Italy into England in the ſame form: it is proper for our farmers to know them, that they may perceive on what their ſucceſs depends; but they muſt be accommodated to the climate. If we ſow lucerne in autumn, it will be in ſome danger from the winter. However, the farmer knowing this, may, if he pleaſes, ſtand the hazard. Young lucerne will be deſtroyed by thoſe winters which will not affect it in a more eſtabliſhed growth; and in the ſame manner, a field of it that is ill managed, and poor, may be hurt by froſt, when one that is in better condition eſcapes. As to the October ſowing, if the winter be ſevere, and the ſoil unfavourable, the crop may be loſt; if it ſhould prove mild, and the ſoil be agreeable, the lucerne will ſtand; and it will have got ſuch ſtrength, that it will make much better head early in the ſucceeding ſummer.

As we would not lead the farmer into hazards, we ſhall adviſe him not to think of the October ſowing, but to limit himſelf entirely to the ſpring, and to wait till late in that ſeaſon, that the danger of the froſts may be over.

We have blamed the huſbandmen of Italy, for deferring their ſpring ſowing till April; but we ſhall recommend that practice to the Engliſh, and adviſe the deferring it here till toward the middle of that month.

Sowing earlier, may, in ſome years, ſucceed better; but this depends upon accidents, and we would not have the farmer liable to them in a new undertaking. If it be ſown in March, and a mild dry time follow, it would be better than later; but in other caſes, the expectation of a crop is eaſily deſtroyed: if a great deal of wet come ſoon after ſowing, it will rot the ſeeds in the ground; and if froſts of any power follow the time of its coming up, they will utterly deſtroy the crop.

The quantity of ſeed to an acre, muſt be determined by experience; but ſowing it by the broad caſt, which has been the cuſtom in England, is by no means proper; and a larger quantity of ſeed than needful has been allowed. The method we propoſe by the drill, will determine the needful quantity. The plants ſhould ſtand at about ſeven inches diſtance in rows, and theſe rows ſhould be at a yard one from another. It will be poſſible to work the horſehoe in theſe, and the plants will be well ſupplied with nouriſhment. The farmer need not be afraid of having a ſufficient quantity of plants upon the ground; for each, if rightly managed, will, when grown to perfection, have from a hundred to two hundred ſtalks.

When lucerne is ſowed thin in drills at a yard diſtance, in the middle of April, upon a proper ſoil, the moiſture and warmth of the ſeaſon ſoon bring it up. When it has a little height, the farmer is to ſend in ſome hand hoers, to hoe up the young growth of weeds, and to thin the plants where they have come too thick, leaving the moſt promiſing at the rate of about four in every two foot. They are not to thin theſe to exactly ſix or ſeven inches diſtance each, but to preſerve the beſt plants in about that number. Theſe hand hoers are not to meddle with the middle of the intervals, but only to deſtroy the weeds, and break the ſurface of the ground about the rows.

This done, the plants are to be left to themſelves till they are of ſome ſtature: then the hoe plow is to be ſent in, and a tolerably deep furrow is to be turned in the centre of each interval.

This is to be repeated as often as weeds appear, only leaving here and there an interval unplowed for the convenience of making the hay.

The intervals left at one time may be plowed up at another; but in that caſe there muſt be ſome made ſmooth by rolling, at proper diſtances.

Lucerne will thus thrive very well till graſs begins to grow among it, which it is apt to do, to the deſtruction of the crop.

In this caſe there muſt be a good furrow plowed from each ſide of every row; and afterwards there muſt be harrows brought in to the ground, and drawn croſswiſe; theſe, without injuring the crop, will tear away the graſs which the plow has raiſed, and ſuch as grows among the plants; after this, the two furrows firſt plowed up, beſide each row, are to be turned again upon them; and there will be the double advantage of clearing away the graſs, and giving the roots a fine quantity of freſh earth for their nouriſhment.

The graſs that was before left upon the ground, and half killed by the ſun, will be thus buried and thoroughly deſtroyed; and after this it will not be able to make any head again for a great while.

The thinning of plants in the rows by the hand hoe, muſt not be done till they have got ſome ſtrength, for fear of accidents. The ſweetneſs of the lucerne leaf, when very young, makes it liable to damage by the fly, therefore it is proper to ſee that danger over before it is thinned: when the plants have got ſome ſtrength, this inſect never attempts them.

Horſehoeing afterwards is to be repeated oftener than to any other ſpecies for this reaſon, that it is to forward ſo great a number of crops. Thoſe who have hitherto raiſed lucerne in England, following the common method of huſbandry, have contented themſelves with two crops a year: but we ſee what it yields in other countries, and by the ſame management we may bring it nearly to the ſame richneſs here.

If the farmer ſhould have neglected his lucerne, ſo that the natural graſs ſhould become a turf, and the plants appear in a decaying ſtate; the four coultered plow is then the inſtrument.

This breaks and tears a turf to pieces, be it ever ſo tough and thick: with this he is to go round every row, turning the furrows toward one row, and from the next, the firſt time; and the next, from the rows they were turned toward before, and to the others: thus taking care not to hurt the plants by letting the furrows lie too long upon them, the graſs will be deſtroyed, and the plants will recover.

There muſt be ſome intervals left as in the common courſe for the making of the hay; and there will be found no difficulty of making this moſt valuable plant ſucceed perfectly well in England, and afford its numerous crops as in other countries.

CHAP. XXIII.

Of the value of lucerne, and manner of uſing it.

THE ſuperiority lucerne has over other graſſes, is in the frequency of its crop; and this is encreaſed by its natural richneſs, and wholeſome qualities.

The others are to be uſed partly by cutting, and giving them green in the racks, partly by drying into hay, and partly by feeding on the ground; lucerne would anſwer all theſe purpoſes, but it is better to ſpare the laſt; for the feet of large cattle would tread it down in ſuch a manner, that the owner would loſe much more in his ſucceeding crops, than would equal the advantage of that feeding. In the other two methods it anſwers excellently, and a part of it may be given freſh cut and green all the ſummer, while the reſt is making for the winter ſervice, or for ſale.

The beſt ſeaſon for giving it firſt to cattle green, is ſpring, becauſe its natural effect is purging firſt, and afterwards fattening them: but in this, as in clover, there is ſome danger of making them ſwell at firſt, if given injudiciouſly: to prevent this, uſe the ſame precautions as with clover, giving them ſtraw among it firſt, or beginning by a little at a time.

This way it is ſafe for all cattle; nothing ſtrengthens or fattens a horſe like it, and no food makes cows yield ſo great a quantity of rich milk.

The danger of cattle's hurting themſelves by it, will be avoided by their not being turned into the fields, to eat at their pleaſure.

In this manner of uſing, a field of lucerne will continue in heart many years: nay there is no ſaying when it will be worn out.

The making it into hay is of great conſequence. The profit is large, and therefore it is worth the farmer's while to be ſtrict in obſerving all particulars.

The principal are two, that it be cut young, and that it be well dried. As to the firſt it is to his advantage in every reſpect, for the hay will be ſweeter, and the next crop will come much ſooner than if more time were loſt, and the roots exhauſted.

The exact and proper time for cutting lucerne is when it is preparing to flower, but has none fully open.

The flowers of this plant ſtand in little heads, and the plant muſt be watched carefully for their appearance. As ſoon as they have formed themſelves is the time of cutting the crop; and the roots being full of vigour, there will be a ſhoot of four or five inches high, while the hay is making.

There is no appointing the exact times of mowing the ſeveral crops, but it will be eaſily found by obſervation. The firſt muſt be cut as ſoon as the plants are in this condition; and the others as they ſucceſſively get into the ſame ſtate again after every mowing. The ſtalks of this plant grow ſtubby and hard, when it ſtands too long; but they are by this means cut while it is tender; cattle are fondeſt of it when in this condition; it leaves the roots the ſtrongeſt, and the next crop follows quickeſt; and being cut in the ſame manner, when juſt getting toward flowering, it ſerves in the ſame way the farmer's purpoſes beſt, and makes preparation for the next in ſucceſſion. The field of lucerne yields from time to time, during the whole ſummer, ſucceſſive crops, and all very large, of an excellent hay. With reſpect to the horſehoeing, the oftener that is repeated the quicker the crops will follow one another, and the more plentiful they will be.

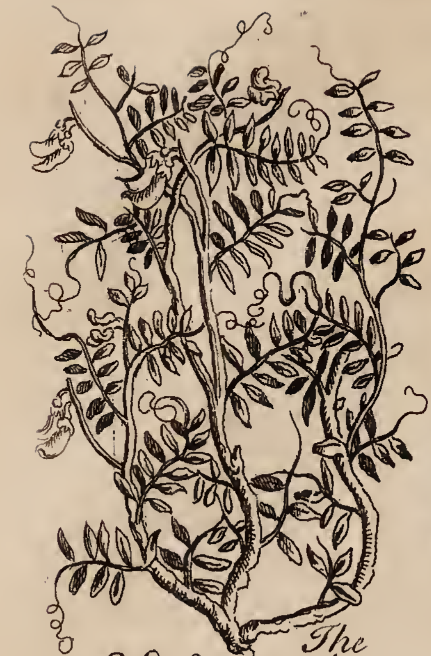
While lucerne is in this proper condition for cutting, the ſtalks are ſingle, upright, and of a pale green: after this, when the flowers begin to open, they become branched and grow yellow, and then they ſoon will be ſticky, taſteleſs, and unprofitable.

The mowers muſt have one caution, to keep their ſcythes ſharp, and go on evenly throughout the ground, for on the ſmoothneſs of the top depend the quick and numerous ſpringing of the ſhoots.

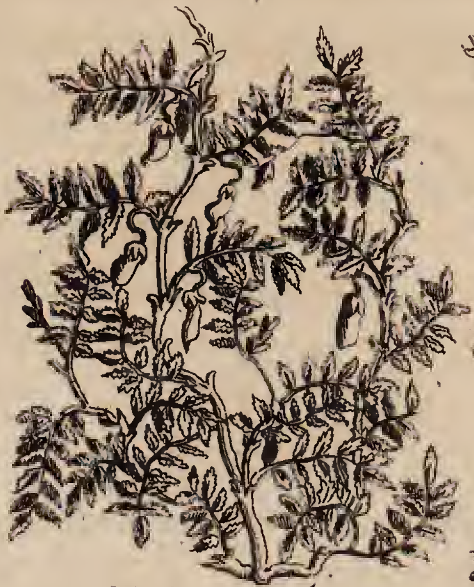
When mown it is to be ſpread upon the intervals left plain, or rolled ſmooth for that purpoſe, and carefully turned and dried. It requires more care in this reſpect than clover or saintfoin, for it is more apt to damage afterwards. It is apt to deceive the farmer, for it will ſeem dry when it is not thoroughly ſo, and in this caſe will be apt to get damage afterwards, and ſo ſpoil the hay of other crops that lie near it.

The ſeed is uſually imported from France, but it is poſſible to bring it to ripeneſs here; a warm dry gravel, well expoſed,

Pulses and Artificial Graſses



The Lentill or Till



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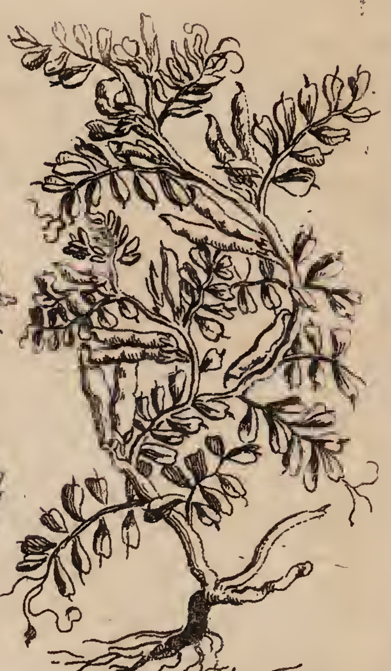

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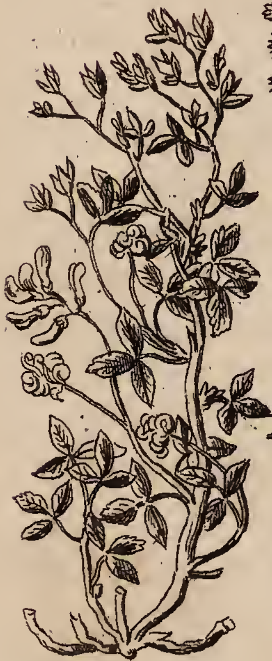
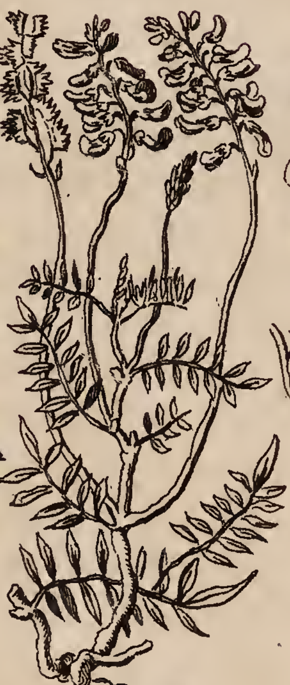
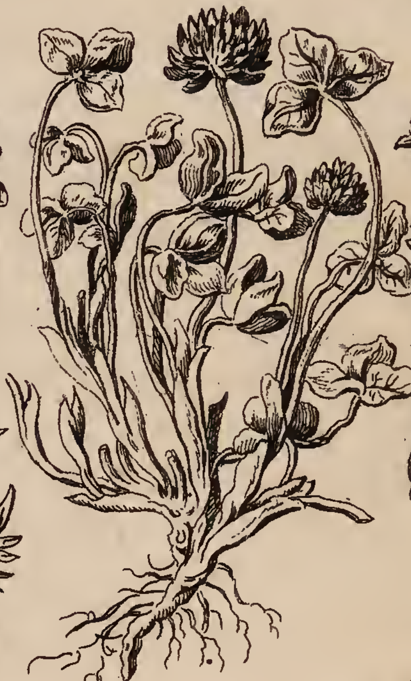


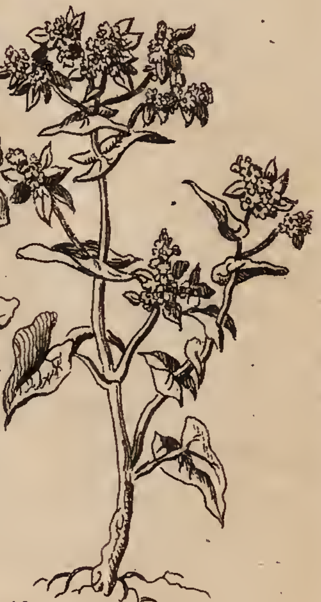
Lucerne



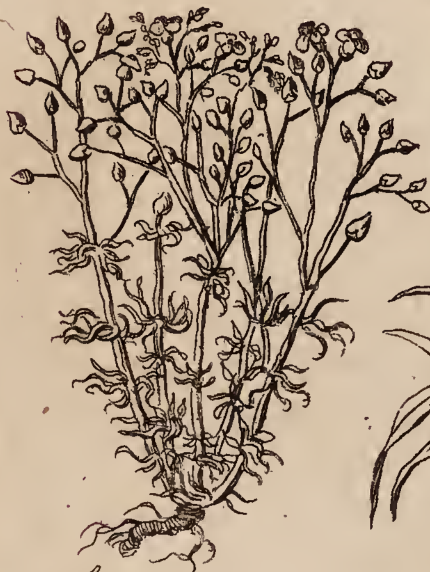
Saint Foin



Clover



Buck Wheat



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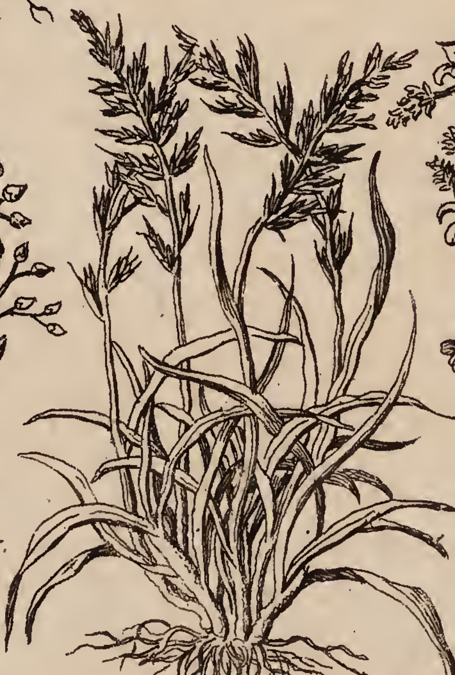
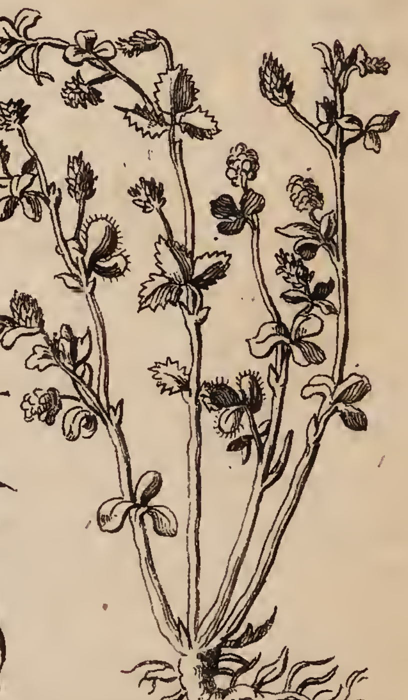


Ray Graſs



Hop Trefoil

is to be choſe for this, and the plants are to be thinned to a greater diſtance. They will riſe into large and numerous ſtalks, and theſe muſt not be cut down at all, but left to follow the courſe of nature: their flowers will thus appear in great abundance, and after them the pods, in which, if the ſeaſon be favourable, the ſeeds will ripen to all the perfections of ſuch as are brought from abroad.

CHAP. XXIV.

Of hop trefoil.

WE have before ſpoken of the uncertainty in huſbandmens expreſſing themſelves, concerning the plants they cultivate. This is another inſtance: they call this plant trefoil, and three leaved graſs. This is the caſe with the writers on huſbandry, as well as thoſe who practiſe it, and in them it is moſt unpardonable. When they propoſe to inform the ignorant in the uſe and the management of a plant, from which a profitable crop may be raiſed, 'tis fit they ſhould firſt inform them what the plant is. This they think they have done when they have called it trefoil, or three leaved graſs, not knowing, or not conſidering, that theſe are the names of no particular kind, but of all thoſe plants which bear three leaves on a ſtalk. Trefoil is the name of clover, and of all the other plants of the three leaved kind, therefore there requires more diſtinction. The plant cultivated under the name of trefoil in certain counties, may be known under that name in thoſe places; but the inhabitants there do not want the information: he who writes does it for the ſervice of all perſons: thoſe to whom he can be moſt uſeful upon that head, are ſuch as live in counties where the plant is not cultivated, and who, by this means, may bring it into uſe. Theſe can never know what the plant is by ſuch a name: it is needful to diſtinguiſh it by one more particular, and to eſtabliſh that name by a deſcription. This is the courſe we have followed in the preſent work.

There are many plants which have the leaves always three on a ſtalk, or three at a joint, and theſe are all called trefoil, but with the addition of ſome word, by which the kind is diſtinguiſhed; one of theſe is this trefoil, ſimply ſo called by the farmers, and raiſed like the other artificial graſſes for feeding their cattle: the diſtinction of this is, that the flowers grow in ſmall heads, reſembling a hop; and from this it has been called hop trefoil or hop clover; and in Latin trifolium lupulinum, which means the ſame. There are more kinds than one of this hop trefoil, but the largeſt is that choſen for culture. Under this name the plant will be found treated of by all who have written on herbs, and the farmer knowing it by this name, will be able to inform himſelf and others about it.

This, though the largeſt of the hop trefoils, is but a ſmall plant, but it grows thick, and makes amends for the want of height, by the number and quantity of its ſtalks.

The root is whitiſh, ſlender, and hung with fibres; the leaves ſtand three together, and are ſmall, oval, and of a pale green: the ſtalks are eight inches high naturally, but they may be made taller by careful management; the flowers are ſmall and yellow, and they ſtand in oval tufts, which in a certain ſtate much reſemble hops: the ſeeds follow, and are contained in dark coloured huſks, and ſtand in a head or cluſter of the ſame form.

It is a native Engliſh plant, and therefore ſtands all weathers, and all ſeaſons: for the ſame reaſon alſo it ſows its ſeed, and continues itſelf upon the ground better than any of the foreign kinds, and is up earlier in the ſpring. This gives it a conſiderable value with the farmer.

This was one of the firſt improvements made by the Engliſh farmers, in the way of the artificial graſſes; but ſince the introduction of the others it has been leſs regarded, though on many accounts it is very valuable: it ought always to be remembered, as one of the many crops by which he may vary his courſe to the eaſe of his land, and his own great advantage.

The ſoil that ſuits the hop trefoil beſt, is a ſoft mellow earth; next to this it proſpers in a light rich loam: it will grow on almoſt any ground; but beſt on theſe; and worſt of all on ſuch as are clayey or wetiſh. The farmer who has a dry piece of ground, and has a mind to hop trefoil, need not ſcruple ſowing it let the other condition of the ground be what it will: he will have a better or a worſe crop according as the ſoil more or leſs ſuits the plant, but he will never fail of having enough to anſwer his common purpoſes. Hop trefoil may be ſown alone or with corn: it has alſo a third uſe, which is, the propagating it in common paſtures. This is done by ſprinkling the ſeed among the graſs, where it freely comes up, and thickens it and improves the quality.

In the field, whether alone or with corn, it may be ſown either in the huſk or naked. For a general rule we ſhall tell the huſbandman, that if he ſow the ſeed naked and clean, he is to allow twelve pound weight of it to an acre; and if in the huſks he is to meaſure it, and allow to the ſame ground two buſhels.

He will by this diſtinction have ſome general gueſs, at the meaning of thoſe practical writers, who are leſs nice in their explanation: when he reads of trefoil ſeed by weight, he will know it is meant of the clean ſeed; when by meaſure, of that in the huſk.

As this is the plant never expected to grow large, we ſhall adviſe the farmer to ſow it at random, in the broad caſt-way; and prefer the ſeed in its huſks, rather than naked. This defends it from inſects, and from damage by wet till it ſhoots; it makes it ſpread eaſier from the hand, the quantity being larger, and it ſhoots the quicker for it. This was the intent of nature, for the ſeed falls to the ground huſk and all; and we ſhould be wiſer than we are, if we took pains to follow her inſtruction and example in more inſtances.

The farmer ſowing two buſhels, by the broad caſt-way, will have a thick promiſcuous crop early up; and it will be continually thickening itſelf more by the ſhedding of its own ſeed which never fails to grow in abundance; it will do this even when eaten upon the ground, the flowers being very numerous, and ripening in ſuch a ſucceſſion, that there are always ſome heads ready to ſhed their ripe ſeed: but if it be let to ſtand for hay there will be millions of new plants.

There are two ſeaſons for ſowing this trefoil, autumn and ſpring, either alone or with his winter or ſummer corn; but it will ſucceed beſt ſown alone.

The earth requires no great preparation for this crop, for the plant being wild will grow any way. The ſeed will not grow if it be buried too deep. This will inſtruct the farmer to ſow it in ſuch a manner, that it may be lightly covered; and afterwards to bury it by deep plowing, when he intends another crop; for without this care it will riſe among the corn when not intended, and often be prejudicial.

For ſowing this, he ſhould chuſe a calm day, for being large and light, the wind would take effect upon it, and ſcatter it unequally, however ſteady and careful the hand were that ſowed it.

When it is on the ground the beſt method is to draw a roller over it, and then to harrow it lightly. This is more trouble than many take, but it is not much, and the advantage in the crop will anſwer it. The rolling alone would be ſufficient, but that if a ſhower comes it looſens the ſeeds, and if a windy day follows, it ſcatters it at random. In the harrowing great care muſt be taken to do it light, otherwiſe the ſeed will be too deep buried.

The crop will riſe quick, and increaſe in value every year. It may be fed or mowed at pleaſure, and the beſt management is to do both at the proper times. It is hardier than any of the others, and leſs liable to damage: cattle are very fond of it when cut and given them freſh in racks, but they may be turned into the field alſo almoſt at any time without hurt. Of all the plants of this kind none is ſo wholeſome as the hop trefoil: ſome ſow a proportion of it among clover, to prevent the effect of that plant, in ſwelling and diſordering the cattle that eat it. They grow very well together; and the right proportion is five parts of clover ſeed, and one of clean hop trefoil.

The early appearance of this trefoil is of great ſervice to the ewes and lambs in ſpring, and alſo to cows and oxen.

The greateſt inconvenience is, that he finds a difficulty to clear the ground of it when intended for ſomething elſe; but we have given the method of doing this effectually: it is only to bury it by a deep plowing, for neither the ſeed nor root will grow when they are covered to any depth.

CHAP. XXV.

Of ray graſs.

THE farmer calls many of thoſe plants which he ſows for anſwering the purpoſes of graſs, by that name, though of different kinds; but this ray graſs is properly a graſs only of a particular and valuable ſpecies. Its uſe is the ſame with that of the ſeveral kinds laſt mentioned, the ſowing for an early food for ſheep and other cattle. It is hardier than any other; and having the appearance, and with it the nature of the better ſort of the common graſſes, it is the moſt eaſily propagated of any. It is hardier than the hop trefoil, and comes in earlier.

There are a great many ſpecies or kinds of natural graſs, differing in greater or leſſer particulars among one another. Ray graſs is one of them, its proper name is darnel, in Latin lolium. There are two kinds of it, the white and the red, ſo called from the colour of the joints of the ſtalks. This is the diſtinction as to colour, but they differ alſo in ſize and quality. The white is the larger, and the red is the hardier of the two. They are both wild kinds, but it is a great advantage to the farmer to ſow them. The red or ſmaller darnel is the beſt, becauſe it is earlier and hardier than the other: and ſends up more numerous leaves. The farmers do not underſtand names much, and they have in this article let in ſome confuſion. The proper name of this graſs is darnel. It is called ray graſs, and this ſome write raye graſs, and others, according to their notions of ſpelling, rey graſs. This rey has been ſpoken as if it were rye, and thence others have written it rye graſs: now rye graſs is an Engliſh name of another kind of graſs, one of the moſt unſerviceable of all the kinds: it grows by way ſides, and has a bearded ear reſembling that of barley. This, inſtead of being cultivated for uſe, ſhould be rooted up wherever it comes:

yet this ſeems to be directed to be ſown and cultivated, by thoſe who write ray graſs in that manner.

Ray graſs is of a middle ſtature, growing to a foot and half high. The root is a tuft of thick and whitiſh fibres: the leaves are numerous, and of a freſh green, they are narrow and ſharp pointed, like thoſe of common meadow graſs, but ſhorter.

The ſtalks are numerous, and riſe among the leaves; they are round, green, firm, and toward the bottom very much jointed. The top of each ſtalk is crowned with a kind of ear, long and thin, compoſed of ſeveral little cluſters of huſks. In theſe are contained the ſeeds, which are not unlike the grains of corn, but ſmaller.

The leaves are more numerous when it has a good ſoil, and the ſtalks, if permitted to riſe to their height, will be much taller; but this is not the farmer's intereſt, for as they grow large they grow hard, and are leſs uſeful.

Ray graſs may be ſown either alone or mixed with clover, which laſt is the beſt way of managing it.

Any ſoil will ſuit it. We have been obliged to caution the farmer, againſt ſowing ſeveral of the laſt-mentioned plants upon clayey or wet ground, becauſe they will not ſucceed thereon; but this is a graſs for land that will ſupport no other. It will grow to advantage on cold, wet, ſpewy, and ſower land.

Some crops intended for the food of cattle, are deſtroyed by a dry ſummer, or rendered of little value; but this is not the caſe with ray graſs; no drought of ſummer, and no froſt or wet of winter hurts it. The farmer ſhould always have ſome land ſown with it, becauſe it will ſtand him in ſtead when all the reſt fail. It is a good winter food for large cattle, and one of the earlieſt ſpring crops for the ſmaller: and at the ſame time there is none more wholeſome.

Ray graſs feeds horſes in a hearty manner, and is of ſo dry a nature that it will prevent the rot of ſheep.

No field will bear ſo large a ſtock upon it as one of ray graſs, becauſe nothing can hurt it; nor is there any harm, but rather advantage in eating it cloſe, becauſe the worſt damage that can attend it, is growing too high. The ſtalks are as tender and full of nouriſhment as the leaves when young, and they grow up immediately after biting.

When the farmer ſows ray graſs with his clover, to correct the bad quality of that graſs, a ſmall proportion is ſufficient; but when he intends to have the full advantage of the crop in feeding his early cattle, he ſhould enlarge the quantity. Three buſhels of ray graſs ſeed is a very proper quantity for an acre, in a mixture with clover; or more may be allowed. After theſe hints, the huſbandman will be able to proportion the quantity to the ſervice; and as the common cuſtom is to ſow a great deal of clover, with a little ray graſs among it, he will often find it prudent, where he is to depend upon the paſture for a conſiderable time, to ſow it with a great deal of ray ſeed, and a little clover.

Ray graſs makes clover laſt many years longer than it naturally would, in whatever proportion it be mixed with it; but if the farmer chuſe to allow it a large ſhare, the paſture will be good as long as he pleaſes. Ray graſs, hop trefoil, and clover, will grow excellently together, where the ſoil is tolerably dry: in that caſe there is no way of making a richer paſture, than by ſowing a large ſhare of the ray graſs, with an equal mixture of the other two, in about an eighth part proportion of each to the ray ſeed.

Beſide the excellent quality of ray graſs, in growing on clayey and other bad ſoils, it will in a powerful manner deſtroy the worſt weeds. Where ray graſs is the principal growth, there are few thiſtles, and if thoſe are but once tolerably got up, they never riſe again; the reaſon is plain, and the fact of great importance. Ray graſs covers the ground with ſo thick a turf, and draws ſo much nouriſhment, for the ſupply after its conſtant cropping, that no ſeeds can get in, and if they do the young plants that riſe from them are ſtarved.

The mowing ray graſs requires a great deal of conſideration, it makes good hay, and its ſeed falling from it, in that condition, is of ſome value; but here the two points of profit interfere with one another, for if the graſs be cut young the ſeed will not have its full ſize or hardneſs; and if it be let to ſtand longer for that purpoſe the hay will be harſh.

The farmer ſhould take a middle courſe, coming in when the ſeeds are beginning to ripen, and the ſtalk is yet tender.

If he want the ſeed for ſowing, he muſt let the crop ſtand ſomewhat longer, and be content to ſpoil his hay, in ſome degree: on the other hand, if he have no regard to the ſeed, he ſhould cut the ray graſs when the ears are beginning to form themſelves: he will thus have an excellent hay, and the roots being unexhauſted by ears, will ſend up a freſh ſhoot in a ſpeedy manner, either for feeding on the ground, or for a ſecond crop.

The ſeed brings ſome price; and when the crop is ſuffered to ſtand for it, four quarters will ſometimes be got from an acre. This at two and nine-pence a buſhel, which may be called a moderate price, is worth ſome loſs upon the article of hay. Some who think of the hay as the principal crop only, gather ſuch ſeeds as are found at the bottom where it is put up; but in this caſe, where a profit is depended upon from the ſeed, it ſhould be thraſhed in the ſame manner as corn: and the hay, far from getting any injury by this management, will be the better.

If the crop of ray graſs be thin, it may be thickened by ſowing more of the ſeed. If this be ſcattered at random among the graſs, it will take, and encreaſe the quantity; a buſhel or two may be uſed for each acre. The beſt ſeaſon is ſpring, but it may be done in October.

This graſs has often ſaved the farmer's ſtock of ſheep and lambs, early in the ſpring, from ſtarving. At all times it is an excellent preparatory for the richer artificial graſſes which riſe after it.

CHAP. XXVI.

Of long graſs.

SOME have ſuppoſed what is called long graſs in Wiltſhire, to be the ſame with ray graſs, but it is a great error, that is a kind of water graſs, with long ſtalks, which will grow but in few places: it is uſeful where it will take, but it requires a rich ſoil, and a proper degree of moiſture, ſo that it is in vain to think of making it univerſal. This kind ripens its ſeed but poorly. When the farmer happens to have a rich wettiſh piece of meadow ground, he may try this ſpecies. 'Tis to be found about ſhallow waters, and may be known by the length of its ſhoots, which trail along the ſides, or float upon the ſurface. Theſe being ſtuck into a damp ground, already covered with other graſs, may take their chance: if they meet with a ſoil, and all accidents proper for them, they will thrive and be very uſeful, if not there is no harm done by the trial. It is worth making in this way, becauſe attended with little expence or trouble.

The place where this graſs was firſt obſerved, was a piece of meadow ground near Maddington, a few miles from Saliſbury; and the effect of it being ſeen, they endeavoured, but without ſucceſs, to propagate it in other places. The ſtalks in this meadow grow to the length of eight or nine yards, rooting at every joint, of which there will be twenty or more in ſuch a length, it proved an excellent food for ſheep. The ſame graſs has been obſerved in other places, and always remarked for its great length: ſheep in particular are fond of it.

As to the other ſpecies of common graſs, none thinks of cultivating one more than another. Thoſe which moſt reſemble the common meadow graſs are beſt, and ſuch as are ruſhy, or have triangular leaves with ſharp edges, are worſt; theſe are natives of ſower land, and watery places. As to the ray graſs, when it grows natural among other paſture graſſes, it is always an advantage, and we have ſhewn how it is to be raiſed to great ſervice by proper culture.

CHAP. XXVII.

Of ſpurrey.

THIS is a plant little known among our huſbandmen, and not to be ranked with many of the preceding in utility: however, as it was once ſown in our fields, and is at this time propagated in Flanders; and as it is not without its uſe, we have thought it worthy a ſhort chapter.

Spurrey is a wild plant in this country, and therefore will not fail to ſucceed eaſily with any kind of culture; as it naturally grows in corn fields, tillage will always be uſeful to it; and as it will grow in very poor ground, and come into ſervice late in the year, when other crops are eaten, it is worth ſome notice.

It is a ſmall weak plant, with little five-leaved white flowers, and a great number of ſeeds following each in a kind of capſule. There are five kinds of it natives of England. 1. The larger or common ſpurrey, frequently wild in corn fields. 2. The little annual ſpurrey, with foliated ſeeds. 3. The common little red flowered ſpurrey, wild in dry places. 4. The ſea ſpurrey, frequent on our ſea marſhes. And 5. The leſſer blue flowered ſea ſpurrey.

The common ſpurrey, and the ſea ſpurrey, are the only ones worth notice; and of theſe the firſt only at preſent is regarded.

The ſtalks are eight or ten inches long, and divided into many branches not very erect, tender, and of a pale green. The leaves are narrow, and there ſtand ſeveral of them at every joint: at the tops of the branches are placed the flowers, which are ſmall but very conſpicuous, being of a bright milky white.

The ſoil that moſt ſuits this plant, is a mellow earth, with a large admixture of ſand. It will thrive very well in expoſures, and in the moſt barren places.

The ground requires no great care for fitting it to this crop. There are two ſeaſons for ſowing it, the firſt is in May, and the other early in autumn: in both caſes it ſhoots very quick, and preſently covers the ground.

The uſe of it is as fodder for cattle; and the way of giving it, in Flanders where it is moſt cultivated, is freſh cut in racks. The produce of the latter ſowing comes at a good ſeaſon, the natural graſs having been well eaten by that time, and recovering itſelf but ſlowly.

It is a wholeſome food, and cattle are fond of it: it occaſions cows to give a large quantity of milk, and gives it no ill flavour: it alſo fattens them, and, as is ſaid, occaſions hens to lay more eggs than any other food. Thoſe fowls are fond of it, and it never has been found to do them any harm.

Ten pounds of the ſeed is the quantity for an acre: it requires only to be lightly harrowed in, after ſowing in the common broad caſt-way, and then will give no farther trouble till cutting, which will be three months after the ſowing.

We have mentioned one ſpurrey beſide this common kind, which may be worth the farmer's notice: this is that which grows about our ſea coaſts. It has not yet been conſidered, becauſe it is not known among thoſe who ſhould bring it into uſe.

This ſea ſpurrey is more worthy notice than the other.

There is nothing we want more than to find proper growths for our ſea coaſt land, and this is one which nature has calculated for that purpoſe. We have a vaſt deal of ground within the reach of ſalt water, which is neglected; becauſe being impregnated with ſaltneſs, crops will not grow upon it: there would be a vaſt advantage in finding uſeful plants proper for theſe grounds; and if they were but of a moderately valuable kind ſtill, becauſe they grow on what would be otherwiſe unprofitable land; they would be uſeful.

We find many pieces of ſea coaſt ground, the ſoil whereof is too looſe and ſandy to bear a good turf. On theſe, which cannot be made to anſwer as ſalt-marſh ground, the ſea ſpurrey might be raiſed with profit. The plant grows wild upon them; and I am able to acquaint the farmer, from experience, that this kind of ſpurrey is equal to the other ſo commonly ſown in Flanders, and at one time not uncommon in England, in its qualities: let it not ſeem the fondneſs for a piece of novelty, that influences me, when I ſay it is better: it is as wholeſome and more juicy; and conſequently every plant of it contains more nouriſhment than one of the other.

This ſea ſpurrey, which we propoſe to the huſbandman, is not unlike the former in its manner of growth, or the ſhape of its leaves or flowers; but it is ſhorter, more upright, and has a fuller ſtalk. It is frequent on theſe ſort of grounds.

It is ſo plentiful that the ſeed, though it is not to be bought, may eaſily be gathered in abundance; a couple of labourers in the month of July, being employed one day for that purpoſe, would be able to bring in a vaſt deal of the wild plant; it is at that ſeaſon very full of the ſeeds, and they will freely come out on threſhing; theſe may be ſown with the leaſt expence imaginable, and they will that year produce a large crop, at a time when it will be very uſeful.

When the ſeeds are got out of the dried plant, they muſt be ſpread upon a floor to harden; and after a week they will be fit to ſow. That time will be enough for plowing up a piece of waſte ground, which will need little farther culture. Let it be well turned up by a plow that will cut deep, and then harrowed over. After this let the ſeed be ſown by the broad caſt-way, in the quantity before-mentioned, and then let a roller be drawn over the ground, to preſs it in.

The land in ſuch a place is of little price, and there will undoubtedly be a crop. Its uſes are the ſame with thoſe of the common ſpurrey: and if it do but equal that there will be advantage in the attempt: but he may be aſſured it will very conſiderably exceed it. This is one of thoſe trials we have to propoſe to the induſtrious and ſpirited farmer, and like all the reſt, it may be attended with conſiderable good, but can do him very little harm.

End of the SEVENTH BOOK.

A COMPLEAT BODY OF HUSBANDRY.

BOOK VIII.

Of ſuch roots as may be advantageouſly planted in fields.

In ELEVEN CHAPTERS.

CHAP.
1. *Of the ſoil for turneps, and manner of ſowing them in the common huſbandry.*
2. *Of managing turneps in the ground.*
3. *Of the uſes of turneps.*

CHAP.
4. *Of certain particular ways of raiſing a crop of turneps.*
5. *Of the potatoe.*
6. *Of the ſoil for potatoes, and the manner of planting them.*

Chap.
7. *Of the preſerving of potatoes.*
8. *Of carrots.*
9. *Of the ſoil for carrots, and its preparation.*
10. *Of ſowing of carrots.*
11. *Of managing a crop of carrots, and their uſe.*

The INTRODUCTION.

WE have obſerved in the preceding part of our work, that the gardener and farmer are intrenching upon one another's province; the gardener planting his proper crops in the field, and the huſbandman often employing himſelf about the products generally ſuppoſed to belong to the garden. This is no where ſo much the caſe, as in the preſent ſubject.

We are in this book to treat of roots which the farmer may advantageouſly cultivate in fields; but which have been originally, and are in general ſtill at this time, the products of the garden. Theſe he will find eaſier to manage than many of his more uſual crops. A field is a great garden; and the main difference lies in the degree of culture. For many of the common products of the garden the well managed labours of the field will anſwer; and if he add more expence, and a different manner of working, he will find it well anſwered by the encreaſe and value of the production.

Many roots may be cultivated in fields: but there are three principal ſpecies, the turnep, potatoe, and carrot. The demand for theſe is continual, and they bring a very great profit.

After theſe are to be named ſome other roots, propagated at preſent only abroad, or confined to one or two ſpots of this kingdom: theſe we ſhall ſeparate from the preſent, treating of them in a ſucceeding book, together with thoſe other products, which are in every huſbandman's power to cultivate to advantage, though they are not yet well eſtabliſhed among us.

Of the three roots we have to treat of here, we have ſpoken of the firſt already, ſo far as the drill and horſehoeing huſbandry are concerned in its culture; to avoid repetition, we refer to that head for many particulars relating to turneps as raiſed by that method; and ſhall here treat of that root only as propagated in the field by the common huſbandry, by which it may equal that of the garden.

CHAP. I.

Of the ſoil for turneps in the common huſbandry, and manner of ſowing them.

A Poorer ſoil will do for turneps in the horſehoeing huſbandry, but in the common way we adviſe the farmer to look upon them as a garden root, and give them what is as near a garden ſoil as his fields will afford. In the new practice freſh ſupplies of nouriſhment may be given them, by dreſſing the ground while they are on it; but in the common way nothing eſſential can be done to that purpoſe: the turneps are to truſt to ſuch nouriſhment as is in the ground when their ſeed is committed to it; therefore the richer it is at that time the better.

A good black mellow earth, with ſome ſmall admixture of ſand, or a very rich loam with a great quantity of mellow earth among it, are the moſt favourable ſoils for the field turnep. We would have our farmer raiſe them to equal thoſe of the garden, and there is no way but by a good choice of the ſoil. It muſt be light and warm, to prevent the deſtruction of the crop; and we muſt add the other quality of richneſs, in order to the roots being well nouriſhed.

Turneps ſtand a great deal cloſer this way, than in the drill and horſehoeing method, and therefore there muſt be more nouriſhment in the land that is to ſupply them. A ſoil too ſandy is never very rich, this is the material objection to that kind, which otherwiſe, from its lightneſs and warmth, would be proper; clays, being heavy and cold, are the worſt of all ſoils for turneps.

The quantity of ſeed we have mentioned before, and ſhall add here, that there is a nicety in covering it which few regard. Errors in this are the cauſe of half the miſcarriages that happen to turnep crops. This ſeed requires to be tolerably well covered, and to have the earth preſſed cloſe about it. From the want of this I have ſeen crops come up poorly on good grounds, and half of them decay afterwards, while the remainder came to little or nothing.

There is no danger of ſqueezing the earth too firmly about them; for we have ſeen very fine crops by ſowing in a barley field juſt before mowing. In this caſe the ground muſt be every where ſqueezed, by the treading and carrying off the corn; but this, far from hurting the ſeed, has ſent it properly into the ground, and the ſtalks of the barley ſheltering it, have done ſervice.

The harrow tears up the ground too much, and buries the ſeed too deep; the beſt way is, when it is ſcattered properly upon the field, to draw a buſh harrow over the ground, and then to go over it with a very heavy roller. There is another method that may be uſed for ſowing of turnips, which is, to have a wooden roller ſtuck full of ſhort pegs, then drawing it over the ground the ſeed is to be ſcattered in, and a buſh harrow is to be drawn over it afterwards, which will ſufficiently level the ground.

This preſſing down the earth about the ſeeds, is of excellent uſe in many other kinds; we ſee ſomething like it practiſed in gardening: they tread the ſeeds in firſt, and then lightly rake the earth over. A good roller would anſwer the purpoſe of treading, and harrows with ſhort ſharp tines, as rakes. This would bring the garden method of working into the field.

The danger of the fly may be, in ſome meaſure, obviated by ſteeping of the ſeed. There is an excellent receipt among the farmers for this purpoſe. Mix equal quantities of ſtone, lime, and wood ſoot. Have ready a quantity of urine, ſufficient to moiſten them into a thin pap. Heat a little of the urine and put to the reſt, that it may be all milk-warm, then mix it by degrees with the lime and ſoot. The lime will preſently ſlake, and the whole will make a ſmooth maſs: pour this when cold upon the turnip ſeed, let it remain four and twenty hours, and then ſow it in the manner we have directed.

CHAP. II.

Of managing turneps in the ground.

WATCH the growing ſhoots while very young, to ſee whether they be taken by the fly. It is impoſſible to guard perfectly againſt this accident, but it is proper to be upon the watch, to know it as ſoon as poſſible, for it ſhould be repaired by another crop.

This danger is only while the turnep is in its ſeed leaf: theſe inſects do not regard it afterwards. The taſte of thoſe ingredients will, in ſome degree, hang about the ſeed leaves, ſo that they will be more likely to eſcape. But the farmer muſt not truſt to it entirely.

The danger is being ſtarved by weeds. Several kinds grow among turnips; but there is one particularly miſchievous, this is charlock, it reſembles the turnep ſo much in the leaf, and manner of growing, that it may riſe in great quantities unnoticed; nor is it always ſafe to order it to be weeded out, for there have been inſtances of the weeders taking up a whole crop of turneps, and leaving all the charlock; this being a time when the turnep has not any thing of a root, whereby it ſhould be diſtinguiſhed. The right weeders at this ſeaſon are ſheep, they will diſtinguiſh where the labourer cannot, and what is very ſingular, they will, in this period of the growth, prefer the weed to the crop.

If a turnep field be over-run with this deſtructive weed, let him turn in a competent number of ſheep; and they will eat off all the charlock, which will never riſe to any height again, and will leave the turneps untouched. This might ſeem a deſperate

perate undertaking, but there is no arguing againſt experience, and this method that has ſtood the teſt of ages. Too many ſheep muſt not be turned in: a moderate number will be ſufficient for the purpoſe, and more might damage the crop which they did not devour.

The charlock being removed, the diſtance of the plants is to be conſidered; and as they generally riſe too thick from this random ſowing, they are to be brought to proper diſtances by the hand hoe. This clears off the weeds, and the turneps are left at a proper diſtance, and with a clear ground freſh broken for their nouriſhment. This hoeing is all the farmer can, in the common method of huſbandry, do for his crop; therefore he is afterwards to wait their growth, as nature brings them to perfection.

The firſt uſe of the turneps is to feed cattle under cover. For this purpoſe a proper quantity are daily to be pulled up, and carried home in carts. The farmer's people uſually begin at one corner of the field, and clearing all off, go on; ſo that by degrees a good part of the field has been left bare, while the crop was growing on the other. The farmer has an opportunity of bringing his field into better condition every day, and for want of a little thought it is utterly neglected.

Turneps raiſed by the drill and horſehoeing huſbandry, are larger than thoſe in the common method: and this is in a great meaſure owing to their diſtance. Turneps in the common way of culture, are ſtarved by ſtanding too cloſe; and here is an opportunity of thinning them. When ſome are to be pulled for feeding in the houſe, the trouble will be little more to gather them in different parts of the field; and the benefit will be very great.

Let the perſons who pull the turneps, draw them in ſuch manner as to thin the reſt of the crop regularly. The very pulling of them up will break the ground a little, and every thing of this kind is an advantage: the turneps left in the field will ſtand thus at greater diſtances, wherefore they will grow to a larger ſize; ſo that they will make amends by their encreaſe in bulk, for all that are taken up; and the crop ſhall be in reality not diminiſhed in quantity, but only in number.

CHAP. III.

Of the uſes of the turneps.

THE table uſe of the turnep will always make a demand for them, and this will be proportioned to the farmer's ſituation, near or remote from a market. He may, on theſe occaſions, ſend a parcel of his beſt turneps, according to the demand, and they will make a handſome addition to his profits.

If he live in the neighbourhood of a great town, it may be worth his while to keep his crop for that purpoſe, making only ſuch a reſerve of the worſt part, as may be juſt needful for his cattle. He will thus be a gardener, only in a larger way. We are next to enquire into the beſt manner of giving turneps to cattle.

It was thought at one time a great piece of huſbandry, to chop turneps before they were given to cattle; but this has been found to have bad conſequences, and is now omitted. This tempted the creatures to eat them without chewing, ſo that they had not half their nouriſhment, and ſometimes they were choaked with the hurry of ſwallowing them. The proper method is to give them whole, and it is more profitable to pull them, than to turn the cattle into the field. They eat more entirely what are given them, ſo that there is no waſte: and they fatten much ſooner when kept up, than when they ramble about.

The only inconvenience in fattening of cattle with turneps is, that it will give a flavour to their fleſh: but this is remedied, by feeding them ten days at laſt with hay.

Wood aſhes are deſtructive of the fly that deſtroys the young turnep: it is a good method to ſcatter ſome thinly over the crop, juſt after the plants are above ground: it will often preſerve them; and is ſo far from doing harm, that it will always promote the growth.

After this fly, the greateſt enemy is the caterpillar. It is a particular ſpecies that ſeizes upon the turnep leaf, and this only devours it while young. It is a ſmall black kind; and will be found very plainly when it is in ſufficient number to do miſchief, for it can do this no otherwiſe than by the multitude, like the fly. When theſe are ſeen the weather is to be conſulted: in a dry ſeaſon they may be deſtroyed at once by proper rolling, but in wet weather that inſtrument muſt not be brought upon the ground. If the condition of the land, and of the air, permit, let a roller be drawn carefully over the whole field, very early in a morning. The caterpillars will at that time be out on their food, and their bodies being tender, the roller preſſing heavily, and the dry earth making ſome reſiſtance, they will be utterly deſtroyed. This preſſure of the roller, far from injuring the turneps, will make them root the better.

The naked ſnail, or ſlug, is alſo troubleſome on theſe occaſions. If it be at a proper time of the growth, the roller uſed in the ſame manner, will deſtroy that alſo; but if the turneps are at ſuch a growth that the roller cannot be taken on, the method is to turn in ſome ducks, they are fond of ſlugs: they will do no harm to the turneps; and their dung will help the ground.

CHAP. IV.

Of particular ways of raiſing a crop of turneps.

THERE may be a very good crop of turneps obtained by ſowing upon the ſtubble, as ſoon as the corn is off. The ſeed is only to be harrowed in, and the crop reſerved till late in the ſpring, for the food of ewes and lambs. If the land be intended for fallow, in the open field countries, they may very well ſtand till April, which will make a ſupply for ſheep, when proviſions are moſt ſcarce. A great deal of the ſucceſs of this crop depends upon the ſeaſon: if the winter be very ſevere it often comes to nothing; if mild it ſeldom fails, and in the other caſe the loſs is trifling.

Another method is to ſow turnep ſeed pretty thick among a crop of hog peaſe, juſt when they are ready to cut. No more care need to be taken in this caſe, beſide the ſcattering the ſeed in proper quantity among the pea ſtalks: but this quantity muſt be larger than is commonly allowed, becauſe ſome will be loſt. The reapers are then to be ſent in, and no particular orders need be given them concerning the new crop. Let them cut and carry off the peaſe in the uſual way, and the treading of the people's feet will cruſh the ſeed of the turneps into the ground, and preſs it down a little, which is aſſiſtant to the growth of this ſpecies.

When the peaſe are off, and the ground has been a little at reſt, the turneps will ſhoot up, and they will be in leſs danger of inſects at this decline of the year, than they would have been in the wet and warm part of ſpring; if any appear the ſame methods may be uſed to deſtroy them, and, one way or other, the farmer has a fair chance for a good winter crop. When the turneps are at ſome little height they will require to be hoed by hand to thin them, and to break the ground about them. The weeds are deſtroyed alſo; but this is a leſſer conſideration, for at this ſeaſon they are fewer than in ſpring.

The neceſſity of thinning the crop is greater in this way of raiſing them than in any other, becauſe they riſe more irregularly; and when they are very thick in ſome parts, and other ſpots are entirely vacant, they ſhould be taken up and tranſplanted. The earth being trod very much, and not broken up, requires this hoeing alſo, for otherwiſe it will be too hard. It anſwers the purpoſe of the ſeeds, becauſe the peaſe have made it mellow.

Another very uſeful way of raiſing a winter crop of turneps, is upon a piece of ground where there have been beans. In this caſe the method is to plow up the land once, and then harrow in the turnep ſeed. Either after beans, or a crop of any kind of corn where it has grown thick, the ground is ſo hollow, that once plowing does very well to prepare it for turneps; and by any of theſe methods, if the winter prove tolerably mild, there will be a profitable crop, but otherwiſe late ſown turneps frequently ſuffer.

CHAP. V.

Of the potatoe.

THE potatoe may very properly be cultivated in fields. It is fitter for the great extent and plain faſhion of a field, than for the narrow compaſs and divided beds of a garden. 'Tis but lately our people have informed ourſelves properly of its culture; and the more we know of that, the more reaſon we ſee to baniſh it the garden. It is hardy enough to bear the expoſure, and it requires no great charge in the culture: why then ſhould we limit it to the garden? every particular ſpeaks for its being giving into the hands of the farmer, eſpecially when near large towns, though every where there will be a great demand. We ſhall therefore lay down ſuch a method for their management, that he cannot fail to meet with ſucceſs.

The potatoe is a plant of a ſingular manner of growth: writers refer it to the nightſhade kind, calling it nightſhade with the tuberous eatable root.

The root is compoſed of ſeveral large roundiſh lumps, joined to one another by ſtrings, and ſpreading a great way in every direction. The ſtalks are numerous, three foot high, branched, and full of leaves. Theſe are divided into ſeveral parts, but the diviſion or diſpoſition is irregular. The flowers are large, and either of a duſky purpliſh hue, or white, the fruit is a large berry.

We had this plant originally from North America. It is in a manner the food of the common people of Ireland; and is cultivated in Lancaſhire, and ſome other parts of England, in vaſt quantities. Our intent is to make it more univerſal.

CHAP. VI.

Of the ſoil for potatoes, and the manner of planting them.

MORE depends upon the chuſing a proper ſoil for potatoes, than almoſt any other root. It is hardy, and will live any where, but it will not ſpread and propagate unleſs the ſoil ſuits.

There are few ſoils that will anſwer, in the right manner, but thoſe that do yield a prodigious encreaſe. The firſt quality the ſoil muſt have is freedom and openneſs, the ſecond is richneſs, and the third a due moiſture. The beſt ſoil of all is a mellow earth, or good fine mould, in the condition wherein we moſt frequently ſee it, which is light, deep, and with ſome moiſture; this points out a part of the kingdom for the propagation of potatoes, where they are very little regarded at preſent, the northern edge of Northamptonſhire, and the adjacent country. They have there this ſoil in great perfection, it is in ſome places too wet, but there it would not anſwer: the place is where the moiſture is moderate.

After mellow earth, the ſoil moſt favourable is a rich loam: if it be of the richeſt kind it is to be mended by dung.

Clay is to be ſhunned, becauſe it will not ſuffer the roots to ſpread; and gravel, becauſe it will not ſupply them with nouriſhment. Chalky ſoils are improper for the ſame reaſon as gravel; as to the ſandy, they fall under the fault of poorneſs, but they are open and free for the ſpreading of the roots; and on ſome grounds of this kind, that have not been too abſolute ſand, improved a little with manure, I have ſeen very good potatoes.

The red potatoe ſucceeds beſt upon the ſandy ſoil: but it never equals that on the rich loam, much leſs that on the mellow earth. The different effects of the ſoils we have named are theſe, the clay will not let the roots ſpread; and the ſandy, though they give room, will not feed them ſufficiently; the light mellow earth produces the largeſt and the moſt numerous roots.

There may be an eaſier improvement made in the ſandy ſoil, than on any other. Laying on a proper manure will bring it into a good condition: the beſt is rotten dung and the mud of ponds.

This being a kind of garden root, let the ground be well prepared. Let it be plowed in a careful manner, conſiderably deep.

Let there be trenches cut acroſs ſix inches deep, and a foot aſunder; in theſe the farmer is to lay regularly, the ſmalleſt roots of potatoes he can get, with a particular care that they be freſh. They muſt be placed ſix inches from one another, and covered up by harrowing the ground all over.

This is to be done in the latter end of February.

When weeds are riſen to ſuch a height that they can be diſtinguiſhed from the ſhoots of the potatoe, hoers are to be ſent in to cut them down; and in doing this they will break and divide the ſurface of the ground ſo, that the rains and dews will get in, and the crop will thrive upon it immediately.

When the weeds have again got up to a height, the hoers are to go in a ſecond time and clear all away.

After this the ſtalks of the potatoe will not be ſo high and ſtrong, that they will ſuffer no more weeds to grow among them.

This is all the culture the potatoe requires, and nothing can be more eaſy. Here is no particular expence in preparing the ground, no great charge of ſtock and labour; and there is no hazard of ſucceſs. The ſale is certain, and the profit very great. One ſummer brings the crop to perfection.

CHAP. VII.

Of preſerving potatoes.

OUR crop has been put into the ground in the end of February, and requires no more time for its encreaſe than to the latter end of September. The potatoe ſhould always be taken out of the earth, before froſts can hurt it.

Begin with that part of the field that lies moſt expoſed: and continue taking them up once in two or three days, as there is a demand. When the ground is affected to any depth by the froſt, get up all the remainder.

Provide a place where to put them: a cellar, with a good quantity of ſand, will anſwer this purpoſe; taking out what he has a demand for, as he wants them, and reſerving the ſmalleſt, for planting in the ſpring.

The produce will be greater than thoſe can believe, who are not accuſtomed to ſuch things: it will depend upon in ſome meaſure the ſoil; the difference is ſo great, that the expence of breaking the land by tillage, and enriching it by manure, will be very amply returned. The ſize as well as number depending on theſe articles.

Ten large potatoes is but a moderate produce, from each ſmall root that was planted in ſpring: when the ground is more favourable, thirteen or fourteen handſome ones; and on counting, with the beſt poſſible exactneſs, in a field of Mr. Ryder's near Thorpe, where every needful caution had been taken, we computed this year, 1746. that there were in general eighteen large and fine potatoes for every ſmall root that was planted. This, for a ſeven month's encreaſe, is very great; but nature has in all things provided, that what is moſt uſeful is moſt abundant.

The decay of the ſtalks will not fail to give the farmer notice to take up the roots. About the middle of September the plant entirely ripens, and after that it quickly fades. The firſt froſts attack the ſtalk and leaves. When the farmer ſees the leaves yellow, and the berries of a dead ripe colour and dropping, let him begin to take up at that time, and continue till all are out of the ground.

It has been propoſed by ſome, to cut off the tops of the potatoe as ſoon as they grow poor, in order to preſerve the root from froſts. I have ſeen this tried, and it is fit I warn the farmer from ſuch a project. It let in the froſt to the roots much ſooner and more powerfully than it otherwiſe would have been, and the conſequence was the loſs of great part of a very good crop of roots.

The advantage of the potatoe remaining as long in the ground as may be, is that it all the time is increaſing in bigneſs, and encreaſe in bigneſs is encreaſe in value.

Some have ventured their potatoes in the ground all winter, covering them with fern and other ſuch matters, beſide their own ſtraw; but this is hazardous, and of no uſe. The potatoes may be preſerved, but they will not grow in the leaſt. The nature of the field muſt determine the farmer who is enclined to this expedient, whether he ſhall venture upon it or no. The more wet there is the greater the danger: ſandy ſoils therefore are fitteſt for this purpoſe. A field may be ſo ſituated, and of ſuch a ſoil, that the ground may ſerve as ſand, and the encloſure keep it as warm as a cellar; but there is no advantage, though there may be little hazard; ſome ſand in a cellar keeps them more ſecurely, and they will no more grow in the field than there.

At the time of taking the potatoes up, the farmer muſt ſend into the ground a man or more, and to every man one or two women, or children; the man muſt have a ſtrong three tined pitch fork, with which he is to dig out the potatoes, and the women and children are to follow him; picking them up, and carrying them to heaps that they may be conveniently taken off the ground together.

When they are got home they muſt be cleaned, and lightly waſhed, and after this dried two or three days in the ſun: they will then be fit for market or for keeping.

Potatoes, when the quantity is very large, may be preſerved during the winter, in a pit made in the ground, but this muſt be done with great care. The farmer muſt ſee for a dry place, where the ſoil is warm, and there is good ſhelter. He muſt dig his pit in form of a ditch, three foot wide, and five foot deep, and line it on the ſides and bottom with dry wheat ſtraw. The potatoes are to be carefully put in till the ditch be full up to the level of the ground; a quantity of ſtraw is then to be put over them, and on this is to be raiſed a ridge of very dry earth. In this manner they will keep through winter, and be ready on all occaſions.

Where the ground is a perfectly dry ſand or gravel underneath, the potatoes may be kept very well in pits, dug for that purpoſe; and thus they are preſerved for the ſupply of the London markets, in thoſe parts of Eſſex and other counties where they raiſe moſt for that purpoſe.

For the ſake of the farmer who ſhall have large concerns in this article, I ſhall give ſome hints reſpecting a particular kind of the potatoe, which though leſs obſerved than it deſerves, has advantages quite ſeparate from the others.

We diſtinguiſh potatoes into two kinds, white and red; but we may very well add a third, under the name of the yellow.

Whoever is accuſtomed to deal largely in this root, muſt have obſerved that there is a yellow kind, which is uſually very large and thin ſkinned. This is kept ſeparate by the Iriſh, who are more uſed to this root, and prefer it to both the others. Its ſize is not the only difference, or the only advantage.

The great danger in potatoes, is the loſing them by froſts: the reaſon is their ſhallow rooting. The yellow potatoe roots deep: the ſeveral new roots are generally lower in the ground, than the firſt was planted; and they will be ſafe when the others are deſtroyed. In Ireland they never take them out of the ground in winter, but as they want them, in many places, but it is becauſe they propagate this yellow kind; for the others would be deſtroyed there, as well as here.

This kind is in Ireland called the Munſter potatoe. It will laſt in the ground a great many years: but though the practice in Ireland, and in Lancaſhire in ſome degree, authorizes this method, I ſhall adviſe the farmer againſt it: I have always ſeen this root flouriſh beſt in a new plantation, and ſhall adviſe to clear, and new till the ground at leaſt once in three years, that he may have its full advantage. I ſhall alſo adviſe him againſt the common practice in ſome places of planting pieces of potatoes, inſtead of whole roots; it is true that pieces with any eye to them will grow, but whole roots always ſucceed better.

CHAP. VIII.

Of carrots.

THE carrot is a root as fit for the field as the garden; requiring very little culture, and producing a great profit. It is hardy enough to ſtand the cold, and other natural accidents:

dents: and though in ſome parts of the kingdom, only hitherto it is kept in fields, is very worthy to be introduced every where, and is indeed, for many reaſons, fitter for the field than the garden. The root is long and thick, varying in colour from the deepeſt orange to the paleſt ſtraw. The leaves are divided into a multitude of minute parts. The ſtalk, when the carrot gets to flowering, riſes in the midſt of the leaves, and is four foot high. The leaves ſtand irregularly on it, and are like thoſe at the root, only ſmaller and paler. The flowers are little and white, they ſtand in a large rounded hollow tuft at the tops of the branches, and are followed by ſeeds that are numerous, ſmall, pale coloured, light, and rough.

There is a variety of colour in the roots of the carrot, the gardeners have hence made what they call three principal kinds. Theſe they call, 1. The dark red carrot. 2. The orange carrot. And, 3. The white carrot. The firſt and laſt of theſe terms are ſomewhat improper, the firſt kind being only a very deep orange, and the other a very pale yellow. The firſt is the moſt eſteemed. The white kind is more common in France and Italy than here; and is the ſweeteſt and fineſt flavoured of them all. The farmer is to cultivate not that which is beſt, but what people think ſo; and therefore he is to chuſe the deep red, commonly called the Sandwich carrot.

CHAP. IX.

Of the ſoil for carrots, and its preparation.

THE firſt thing muſt be to examine whether he have proper ground. Thoſe plants whoſe profitable part is the leaf or ear, may be raiſed on different ſoils, by the aſſiſtance of manure; but theſe which depend on the root can never come to any thing, when the ground is not proper in its own nature.

Three things are requiſite in land for carrots. It muſt be deep, rich, and dry. Theſe do not often concur. Deep and dry is common, becauſe all ſandy ſoils have it; and therefore in general they are fit for carrots; but to be rich withal is the compleating of the buſineſs. The other will give room to penetrate and warmth to cheriſh, but when nouriſhment in abundance is joined with theſe, in the richneſs of the land, 'tis then the ground is compleatly proper.

For this reaſon a fine rich deep garden mould, where there is not too much moiſture, is very proper for them; but too much moiſture is the common fault of this kind of ground. To ſpeak from experience, the very beſt ſoil for carrots is a rich loam: that is, a dry earth, in which is a great deal of ſand, a good quantity of mellow mould, and a very little portion of clay. Some clay there is in all loams, but the leſs the better on this occaſion; I have ſeen excellent land for carrots in Northamptonſhire and Lincolnſhire, upon thoſe riſing grounds adjoining to the fens, and juſt raiſed above them. And in Surrey and Suſſex there are vaſt tracts left in a manner deſart, which would yield great profit from carrots. In theſe inſtances we ſee the vaſt advantages that would ariſe from making the knowledge of huſbandry univerſal; the putting into the thoughts of farmers in one place, what is the profitable practice of another on like ſoils. We hope this work will be inſtrumental to that purpoſe.

The ſoil being choſen, the preparation conſiſts in two articles, enriching it by manure, and the breaking it deep by tillage. All land will anſwer the better, the more care is taken of it in this reſpect: we ſhall ſhew the manner of doing it; for otherwiſe all the expence may be worſe for the crop, than if the land had been left in its natural condition.

The plowing and dividing of the land, ſhould be done juſt before the ſeed is ſown; but the manure ſhould be laid on a year before. This will occaſion no loſs of time with the judicious farmer, for he may have a vaſt crop of ſome ſlight rooting plant, as the ſmall pulſes which will mellow the ground by ſhading it with their ſtalks, at the ſame time that they yield him a great encreaſe, without exhauſting the effect of the manure. After this the land being plowed up for carrots, will be in the beſt condition to ſupport them.

The reaſon of this management is plain: the carrots will have great advantage from the richneſs it gives the ground, for the richer that is the larger they will be; but freſh dung ſubjects the land to worms; and this ſhould be feared more than any other accident, in a carrot plantation. Theſe roots are a luſcious food for thoſe inſects; and when worm-eaten they are worth little.

The ground requires to be open'd very deep for carrots, becauſe their whole value is their length and ſtraitneſs, which they will never attain if they have not a free paſſage. For this reaſon the old practice was to dig the ground with ſpades, the carrots requiring it to be well broken two ſpit deep, and no plow then in uſe anſwering this purpoſe.

This was bringing gardening into the field; but that is not what we mean by recommending to the huſbandman the culture of garden roots. If they can only be propagated in fields at the ſame charge as in gardens, there will be little profit to him, and it is only leading him out of his way; we ſhould not have named the carrot, had we not intended to put him in a way of propagating it with the proper implements of his profeſſion.

The four coultered plow will perfectly anſwer the purpoſe of the ſpade; and this reduces the whole expence, and throws the article directly in the way of the farmer. This plow cuts full two ſpit deep, ſo that it perfectly anſwers the purpoſe of digging by hand; and by the means of its numerous coulters, it cuts, divides, and breaks the whole ſubſtance of the ſoil, better than the ſpade.

CHAP. X.

Of ſowing of carrots.

THE firſt care is to procure good ſeed: this he will know by its ſweet ſmell, its pale colour, and its roughneſs.

The ſeed being choſen, he is to get to work upon his ground in the beginning of March. Gardeners ſow carrots the year round, that they may have crops one under another; but the farmer ſows them for two conſiderations, to have large roots for market, and to get good ſeed from proper parts of his ground, which is abundantly produced, and yields a large price.

The beginning of March is the time when he is to prepare by plowing; and he muſt have a couple of women or boys to follow the plow, to pick up any looſe ſtone or other hard matter that may chance to be turned up.

When the ground is thus deeply cut up and picked, the harrows are to be ſent in, and the ſurface is to be well levelled like the beſt prepared border in a garden: this done it is ready for the ſowing. When the ſeed is a material conſideration the plants are to be kept farther diſtant, and the drieſt and warmeſt ſoils are beſt.

There muſt be a great deal of care in ſowing carrot ſeed: a proper day muſt be choſen, otherwiſe it will be impoſſible to do it well. The weather muſt be calm, and the perſon who ſows muſt go over all the ground carefully, with the ſeeds in his apron, and muſt ſpread them by hand a few at a time. He muſt take care they fall ſeparate; for their rough ſurfaces make them very apt to hang together. When they cling to one another, he muſt rub them in his hands, and thoroughly ſeparate them. His next care is to ſee that they fall regularly. As to the manner of their lying; one about every three inches is the beſt method: not that the carrots are to ſtand ſo cloſe, but there ſhould be ſeeds enough ſown that accidents may be allowed for, and the plants thinned by hoeing.

As ſoon as the ſeed is upon the ground, let a heavy roller be brought on. This ſettles the ſeeds in their places.

This done, a fine and ſhort toothed harrow ſhould be drawn lightly over, and then the article of ſowing is finiſhed. In theſe well prepared lands, the harrow does not bury the ſeed as it will where there are great clods: the rolling and harrowing anſwers to the treading in, and raking of the ſeed in the common practice of gardening; and they ſhoot up as regularly this way as the other.

CHAP. XI.

Of managing a crop of carrots, and their uſe.

As ſoon as the plants are got to ſome little height, hand hoers are to be ſent into the field. They muſt cut up all weeds, and thin the plants. The proper diſtance at which they ſhould be left, is ſeven inches: and thus they are to ſtand till they come to perfection. The ground having been once well weeded in this manner, the carrots will grow ſo vigorouſly, that their leaves meeting, will overſpread the whole, and let no weeds grow between them.

The carrots will grow to a good ſize by the end of autumn, and they will thrive the better if quantities are pulled for market, from time to time, when they are big enough to be ſaleable; not drawing theſe all in one place, but from thoſe cluſters where they happen to ſtand thickeſt.

Toward the end of November the leaves will begin to decay. The farmer will know this by their becoming yellowiſh; and it is his notice for taking up the roots. The carrot ſhould be taken up in the beginning of winter, and laid by in dry ſand, to be kept ready for the market.

Froſt always hurts carrots, therefore, as ſoon as that time of the year approaches, when they are to be expoſed to the hazard, they muſt be taken out of the ground and laid up in ſand: and this muſt be in a dry place.

This is the management of the carrot; it is eaſy and familiar in the greateſt degree; and the profit is great and certain: there is always a market for this root, and the price is ſuch that the profit proportioned to the land and labour is very great.

The root is not the only article by which it is ſerviceable to the farmer, for a great deal of profit is made from the ſeed. This is the produce of the ſecond year, and for this purpoſe the plants may be either left in the ground during the winter, or the roots ſet in again in the beginning of ſpring.

The gardeners uſe the latter method, but the farmer will find the other beſt, becauſe there is leſs trouble; only he muſt take care that he chuſe the drieſt and warmeſt part of the field for that purpoſe.

If the carrots for ſeed are planted, after being kept in ſand during the winter, the largeſt and fineſt roots muſt be choſen: in the other method, the moſt vigorous plants muſt be left. Theſe are to be kept at a due diſtance, about a foot aſunder. In this condition they will gather ſtrength during winter, the ſtalks will riſe early the enſuing ſummer; and the ſeeds will ripen about the middle of Auguſt.

When they are thoroughly ripe the plants are to be cut down with an hook, and laid in the ſun and air four days to dry, frequently turning them. After this the ſeeds are to be beaten out of them; and when ſeparate they are to be aired and dried ſeveral days before they are put up for ſale; they will thus be perfectly fine, ſweet, and well coloured, and will bring a large price.

End of the EIGHTH BOOK.

A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK IX.

Of ſeveral advantageous articles in huſbandry, which are leſs univerſal than the others.

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87. *Of managing the crop the firſt ſeaſon.*
88. *Of managing it the ſecond ſeaſon.*
89. *Of planting a ſecond crop of madder.*
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92. *Of the proper ſoil for the teaſil, and its culture.*
93. *Of aniſeed.*
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100 *Of ſowing of beans.*

The INTRODUCTION.

THE title we prefix to the preſent part of our undertaking, ſhews the ſenſe we entertain of its importance: 'tis the misfortune of the huſbandman, when any thing really advantageous, is not univerſally known. We ſhall recount ſeveral kinds of crops under this head, that deſerve to be made common throughout the kingdom; and ſhall lay down ſuch rules for their management, that thoſe who try carefully cannot miſs of ſucceſs. We ſhall begin with one ſpecies, the value of which is ſufficiently known, in thoſe parts where it is commonly raiſed: this is the hop; and this, as it may be cultivated to the great benefit of the farmer, in many others, we ſhall hope to render more general.

CHAP. I.

Of hops.

THERE are few things by which the huſbandman may enrich himſelf more than hops; but there requires a knowledge of their nature, the ground they ſuit, and the accidents to which they are liable, in order to his entering upon the deſign with a rational proſpect of ſucceſs. Their management in the planting, growth, and gathering, is alſo a peculiar branch of the buſineſs. This is at preſent confined to a few counties, but there are many other places where it will ſucceed as well.

The hop is a tall weak plant: naturally it runs up hedges; and art ſupplies it with poles for this purpoſe. The root conſiſts of thick black ſtrings: the firſt ſhoots are ſoft, and tender, like thoſe of aſparagus, and are eaten in the ſame manner. The ſtalks, as they riſe higher, become rough and firm in their ſubſtance. The leaves are large and rough, and are divided like thoſe of the vine.

It does not appear that the antients were acquainted with the hop. Pliny is the firſt who names it, and that only as a ſallad herb. We are not to wonder we read nothing of it before his time. The Greeks ſtudied utility; and the uſe of the hop in malt liquors, which is its great ſervice at this time, was not known to them. They had malt drinks, but they were not made for keeping. Lupulus is the name by which the hop is called by Pliny, and others; but it is become a faſhion lately, to call it Humulus.

CHAP. II.

Of the ſeveral kinds of hops.

TO ſpeak with ſtrictneſs there is but one kind of hop; for what are mentioned under different names, are only varieties of the ſame plant, as culture and other accidents have changed it. However, as ſome of theſe keep their difference in planting, we who write for utility, not curioſity, may very well diſtinguiſh them according to the cuſtom of others, into theſe ſeveral ſorts.

The planters tell us there are four kinds of hops: 1. The wild garlick hop. 2. The long and ſquare garlick. 3. The long white. 4. The oval. The firſt of theſe is what authors call the wild hop, the three others they confound together under the name of cultivated hops. The wild kind is poor, ſmall, and not worth notice. The long and ſquare garlick is a well taſted hop: but 'tis ill-coloured, for which reaſon it does not bring ſo good a price. The fault in this reſpect is a redneſs about the ſtalk. The long-white is the moſt beautiful hop; and the moſt valuable, becauſe of its greater encreaſe, and the next to theſe are the oval; theſe are ſhorter than the long-white, but otherwiſe equal in colour and flavour. It would be natural to ſay none but the long-white ſhould be cultivated, becauſe theſe are the beſt and moſt plentiful, but 'tis not every land that will bear them. They will live in any, but to thrive they require what is very good; and a thriving crop of the long and ſquare garlick, is better than a ſtarved one of the other.

Let the huſbandman ſuit the kind to his land. All hops love a mellow rich ſoil, but the long garlick being moſt of the nature of the wild hop, will bear a ſomewhat poorer ground better than the others. The proper ſoil for a hop ground is a rich garden mould. But as this is never found entire, we are to tell the farmer that of its two general mixtures, which are ſand and clay, the clay makes it unfit for hops; but the ſand, in a moderate quantity, is not hurtful.

In order to plant hops with any proſpect of ſucceſs, the ſoil muſt be deep and well conditioned to the bottom. If the ground be a pure and fine mould, let him plant the long-white, and no other kind. If it have a moderate mixture of ſand, let him plant the long-white and oval together, for they will do very well in the ſame ground. If it be much inclined to clay he is not to uſe it for this purpoſe: but if only ſomewhat clayey, and he will have it a hop ground, he muſt plant the long garlick. Before he fixes upon his deſign, let him not only examine the condition and depth of the earth, but what is under it. The deepeſt ſoil does not reach far, and in all growths a great deal depends upon the nature of the bottom. A clay bottom is too cold, and retains too much wet; and a gravelly bottom lets it through too faſt, ſo that they have not enough to nouriſh them, for the hop being a tall plant requires a good quantity of moiſture. A loamy bottom is the beſt. That ſort of earth of which bricks are made, is of a very fit kind, and is a common bottom to the ſoil in moſt places. Let the upper coat or ſoil be light and rich, and it matters not for the colour. The Eſſex hop grounds are on a moory land, which is black; and many of the Kentiſh are upon a whitiſh crumbly ſoil, they ſucceed equally well, all that is required being a quantity of good ground, wherein the roots can run with eaſe, and find a due ſhare of nouriſhment.

CHAP.

CHAP. III.

Of the proper land for a hop ground.

PLANTS in general ſend their roots deeper and farther in ſearch of nouriſhment, than is commonly thought: none more than hops. For this reaſon, in preparing land for them, if the upper part be a great deal better than what is under it, the work muſt be done in the way of trenching, and the fine part of the ſoil buried undermoſt. When the ground is over moiſt, it muſt be laid up in high ridges, to be well drained. And when it has been thus managed at firſt, it muſt be kept in the ſame condition, by keeping the drains open and clear. Clayey ſoils are to be avoided, and there are two others nearly as bad; theſe are, the gravelly and rocky. In neither of theſe hops will ever anſwer; but in any others they may be raiſed; and if the worſer kinds be planted on the more indifferent lands, and the finer reſerved for the beſt, with due care they will never fail.

Hops exhauſt a land extreamly. They may be planted after almoſt any other growth, but no other will thrive after them except trees, which root deeper, and ſpread farther than they.

When the farmer has laid his deſign for a hop ground, let him plant it at the ſame time with apple and cherry trees. Theſe draw little nouriſhment while young: therefore the hops will very well ſtand twelve years with advantage. At the end of that period the right practice is to make a new hop ground in another place. By this time the cherry trees will bear. They will continue improving every year for ſome time, and will laſt very well five and twenty years; at the end of this time they may be cut down, and the apple trees will be then in fine order.

CHAP. IV.

Of placing the hills.

WHEN the ground is fixed upon, and a quantity of plants are in readineſs to be taken up occaſionally for it, the ground is to be prepared for their reception. Hops are planted on little hills, and theſe are to be placed at ſuch diſtances as are beſt ſuited to the extent of the ground, and the intended manner of dreſſing.

If the piece be ſmall, the breaſt plow or ſpade muſt be uſed for dreſſing the ground, when the hops are upon it: but it is much better to ſet out with a larger piece, and diſpoſe the plantation for horſehoeing. Whichever method is taken, time and pains are required to put the ground in proper order. October is the ſeaſon for planting the hops, but the preparing the ground is the buſineſs of a month before. The firſt thing that muſt be done is plowing it up, and laying it very even. The ſpade may anſwer this purpoſe in a ſmall piece of ground, but larger are in all reſpects better. The intent is to break the ground very ſmall, to a conſiderable depth. The proper plow is the four coultered one, ſet to its greateſt pitch. In this condition, with the guidance of a ſkilful plowman, it will cut two ſpit deep, and tear the ground all to pieces the whole way. When the ground is broke by this plow, let a harrow be drawn over it; and laſt of all a light roller. It will then have an even ſurface: and this is the condition wherein it is fit for laying out for the deſigned plantation.

The next thing is to determine the diſtance of the hills, and when this is ſettled a long line is to be procured, and a knot is to be tied in it by meaſure, at every diſtance that is ſettled for a hill. The form muſt be determined by the ground; if that be ſmall, and the ſpade or breaſt plow are to be uſed, then the beſt method is the quincunx, which diſpoſes the hills in lines, and leaves regular alleys every way between them, but in larger grounds 'tis beſt in ſquares. The line is to be drawn ſtrait acroſs the ground, from place to place, according to the determined diſtance, and a ſtick is to be fixed down at every knot. This marks the placing of the hills.

When the ſoils is thus turned and mixed together, the planter will be better able to judge of it than before. If it want richneſs, let him add ſome good manure to the places which are marked for the hills. It is rarely that a piece of ground is ſo perfectly good, as not to admit of this improvement, and as it is very great, and of no vaſt expence or difficulty, 'tis always worth while to do it. We ſhall therefore adviſe the huſbandman in general, to plant his hops in a compoſt. The beſt method of making it is this. Dig a quantity of rich fine earth, proportioned to the number of hills; add to this one fourth part the quantity of very old and well rotted dung, and about a tenth part of ſharp ſand, let this be well mixed and ſtand in readineſs. Then at every ſtick open a hole two foot deep, and a foot and half ſquare, fill this with the compoſt, and all is ready for the plantation. The diſtance of the hills is one of the niceſt things in the whole buſineſs. Neither can any general rule be given about it: for the nature of the ſoil, and extent of the ground, and intended manner of working, will make variations. Eight foot diſtance is a medium. If the ſoil be worſe than ordinary, he may make his hills at ſeven foot diſtance, and if it be very rich and fine to ſet them at nine foot.

If it be at any time found either in a new ground or an old one, that it will nouriſh more hops than there are upon it, the beſt way is to add to the number of plants upon each hill, and not to multiply the hills. So that the planter need not be afraid he ſhall place them too diſtant.

CHAP. V.

Of planting the hops.

THE hills being prepared, are to be planted; and care muſt be taken in the providing ſuch ſets as are excellent in their kind. Let the huſbandman truſt no eye but his own for the choice, and let him obſerve the following cautions. Let him conſider the ſoil from whence he has them; here there are two eſſential points, which in a manner contradict one another. 'Tis neceſſary he ſhould have the ſtrongeſt and moſt flouriſhing ſets he can procure, and 'tis beſt that he have them from a poorer ground than his own. Let him be ſure they do not come from a richer ſoil, for then they will certainly dwindle. Let him chuſe the ſtrongeſt ſhoots of a middling piece of ground; for his compoſt into which they are to be ſet will certainly exceed that in richneſs, ſo that they will be forwarded for the firſt ſhoot; and the whole ground being newly ſtirred, they will ſpread their roots without difficulty, when they have ſhot them beyond its extent. When the planter goes into a ground for purchaſing his ſets, let him examine the height of the hills. Nothing ſo ſtrengthens the ſhoot of the hop, as the raiſing the hill high. Let him therefore chuſe them from ſuch hills as have been moſt raiſed the preceding year, and from ſuch as are fulleſt of ſhoots; becauſe this alſo is a ſign that the roots whence they come are hearty.

Having fixed upon the hills, let him chuſe the largeſt ſets, and ſee them taken carefully up, they ſhould be ten inches long, and have four joints or buds. When a proper quantity are taken up, according to the number of hills there are to be, let them be laid in the ground in a cold and damp place, and taken out as the holes are prepared for their reception. In the center of every hole that has been filled up with the compoſt, let there be a ſquare opening made of a foot deep, throwing up the earth on the ſides. Into this, which muſt be a full foot deep, put four of the ſets. Place one at each corner: ſet them upright, with the top juſt level with the ſurface of the ground, and then throw in the earth that had been dug out, fixing it well about the roots. Cover the tops about two inches with the fineſt and lighteſt of the mould, and the hole is finiſhed. Thus the foundation of one hill is laid.

In the ſame manner plant four ſets in each hole. A thouſand hills will ſtand in an acre of ground, ſuppoſing it of the middling kind; and this is the whole trouble of planting them. The expence is not great, for the ſets are ſold cheap enough, and an expert perſon makes quick work in planting them. The huſbandman ſees the eaſe with which hops are raiſed, we ſhall now tell him the encouragement he has to plant them. No produce whatſoever is equal to them: they may reaſonably be expected to yield fifty pound an acre, and ſometimes in favourable ſeaſons, when the ſoil and ſituation are right, an hundred. Nothing is more ſurpriſing than that hops are not propagated univerſally: at preſent the planter need not be afraid of overſtocking the market. The demand is greater by much than the ſupply; and we annually import a vaſt quantity of them from Flanders, though inferior to our own. No country ſo much favours their growth as England; nor is there any county throughout the kingdom where they may not be raiſed to this certain and vaſt profit. Theſe are the common rules obſerved in putting the ſets into the ground; but as this is an article of the greateſt conſequence, we ſhall enlarge upon the particulars.

Let the planter ſee that his holes are perfectly prepared, before the ſets are taken out of the ground, for the beſt care that can be taken of them is the putting them quickly into their places, nothing prejudicing them ſo much as keeping them long out of the earth. In taking them up the greateſt caution is to be uſed, not to bruiſe the roots; and whatſoever parts of them may happen to be ſo injured, muſt be cut off above the bruiſed part, for this always decays; whereas, when the roots are cut off clean, they not only are ſo many mouths themſelves, but every one of them ſhoots out ſeveral ſmall roots. The bruiſed parts grow preſently mouldy, and the infection ſpreads from them to the reſt of the plant: every fibre that runs near one of theſe mouldy ones is ſure to be tainted.

Not only the fibres are to be cut off at the ends, and the injured roots to be taken away, but if there be any roots that run croſswiſe of one another, or any that ſpread with a tendency upward, the firſt are to be cut quite off, and the others are to be ſhortened almoſt to the ſet. The croſs roots, if too near, will preſs and injure one another; and the hop is to root deep in the ground, therefore the others ſtraggle in a wrong manner. As to the depth of the holes, what we have given is a general rule, but it may admit of exceptions: we are to accommodate ourſelves to the condition of the ground. If that be rich, free, and fine, we may plant the deeper, but if it have a bad bottom we muſt go the ſhallower in the firſt ſetting, leaving the plants to puſh afterwards.

When the hole is dug and the plants are ready, let the planter obſerve that he ſet them ſo, that as near as may be they may ſtand covered juſt as far as the point or head: when the hole is ſquare, four are to be placed at the corners; and if one more be added, it muſt be juſt in the center; if two more, in a line going acroſs the middle, and at equal diſtances from all the other. When the ſets are in the hole let the compoſt that is to fill it up be broke very fine with a ſpade, and thrown in a little at a time. In this manner it will fall all round them, and about each ſet, leaving no hollows. When a little is thrown in it is to be ſettled about them with the hand, and when all is in, it is to be preſſed with the feet, but not too hard: the intent is, that it may every where fall cloſe about them, and yet it is not to cake about their ſtems. Some who plant in ſpring, if the ſeaſon be dry, water their young ſets, but this is altogether wrong. The depth at which they are planted is ſuch, that the earth will always have dampneſs enough to ſupport them, and it is a ſeaſon when there muſt come rains ſooner or later.

There are people who, inſtead of opening the whole hole, and ſetting in the plants regularly by hand, place them in the new made ground with a ſetting ſtick, cloſing the earth about them as gardeners do in the common way of planting: but this is a very ſlight and inconſiderate method: the hop plantation is an undertaking of great conſequence, and 'tis worth while always to ſet about it with care, and all poſſible advantage of the ground: the ſucceſs of the firſt year will over-pay any extraordinary or particular expence on that head. When the planter has got his ſets into the ground, let him leave them to nature for their growth, and the next ſummer let him watch them in their fruiting. Some will riſe worſe than others, but he will find ſome better: he is to mark the hills of both kinds, the worſt to take away, and the better to propagate. Let him take care of thoſe hills on which the fine ones grow; and the next year, when the time of tying is come, the ſuperfluous ſhoots on theſe fine hills are to be reſerved for laying. When the others are tied up, theſe are to be cut off at the top, and laid all the reſt of their length, burying them in the ground; in this condition they will each ſend up a great number of ſtrong and healthy ſets, which in the ſucceeding autumn may be planted out into places where the hops were worſe than the reſt. In this way every year the hop ground will be improving, and by proper management, and due tendence, will ſucceed perfectly.

CHAP.

CHAP. VI.

Of dreſſing and managing a hop ground.

THE profit from the hop is very certain; though it vary greatly, according to the ſeaſons and other accidents; but this ſuppoſes a due knowledge and care in the dreſſing of the ground. It will be ſix times as great from a ground well, as from one ill managed. The farmer is not to look for this information among the planters themſelves, for they know little, and that little they keep ſecret. Half their plantations are poor, from want of care or want of judgment; and from what I have ſeen I ſhall freely add, that the very beſt of them do not yield half their natural produce. There is not any hop ground I have ſeen but might double the owner's profits, with a more judicious and diligent management: we ſhall lay down the perfect method, and it will be found not at all difficult or perplexed: when ſo familiar a practice is rightly underſtood, let it be carefully followed. The expence is very moderate; and though the plantation is liable to accidents, more than any other growth whatſoever, yet with due care one half of them may be prevented, and the greateſt miſchief of the other remedied.

The firſt dreſſing depends on two principles, the earth is to be broken that the roots may find an eaſy paſſage; and the weeds are to be deſtroyed as they riſe. There is no way ſo proper as by the horſehoeing. The young plants will have the winter for fixing themſelves in the earth, they will ſhoot out freſh roots before the cold reaches the depths at which they are planted; and theſe will ſtrengthen well in the ground before ſpring, ſo that they will then ſhoot vigorouſly.

CHAP. VII.

Of polling the hops.

POLES are next to be provided: for the ſooner they are fixed the better, that the roots may not be diſturbed by them. Three, four, or five poles muſt be allowed for each hill: the difference is to be made according to the diſtance of the hills; if theſe be at ſeven foot three poles will do for each, if at eight foot four, and if the diſtance of the hills be nine foot, there ſhould be five poles to each. The bigneſs and length of the poles are to be proportioned to the condition of the ground, and the growth of the hops. In moderate grounds poles of a moderate ſize will do, but in rich earth, where the growth is ſtrong, the poles muſt be large, ſtout, and very tall, otherwiſe a great part of the profit may be loſt.

The growth of the hop will be in a great meaſure determined by the length of the pole; if that be tall the ſtalk will run up, and if the ground be but poor, the whole nouriſhment will be exhauſted on the ſtem and leaves which ſhould go to the fruit, ſo that they will make but a poor progreſs. A caution is therefore neceſſary against over-polling, than which there is no error more deſtructive. When the hills are placed at ſuch a diſtance that there is ſpace for the roots going far for nouriſhment, and that is provided in abundance by the dreſſing, in that caſe we can get no poles too long; for there are none ſo high but the ſtem of the hop can get to their top, and flouriſh over it; and yet have ſtrength at the root for nouriſhing and filling the fruit, which will in this caſe be the more numerous in proportion as the plant is larger and ſpreads more.

We are ſpeaking of the firſt year of a hop ground, and in this ſome particular caution is neceſſary. If the ground be but indifferent, let the poles be very ſhort this firſt year, for nothing is ſo dangerous as carrying up the plants too much in height the firſt ſeaſon in ſuch ground. If they be led into a habit of running too much into ſtem this year, the fruit will be ſmall, and the fault never be recovered. Even in the beſt grounds where ſoon after no poles can be too long, it is a good caution to uſe ſuch as are ſhorter the firſt year; not tempting the plants to run up too high, but encouraging them into fruit. They will take the advantage of the longeſt poles afterwards, and fill the whole growth with fruit. An acre of hop ground will require between three and four thouſand poles. Let theſe be laid in upon the ground between the hills, to be in readineſs. Fifteen foot is a moderate length. The largeſt poles ſhould be twenty foot long, and ſeven inches round, but theſe are too big for any condition of the hops the firſt year; ſo that ſomewhat ſmaller are better in all kinds in the beginning. Alder poles are very proper, they are ſtrait and run high; aſh alſo are excellent, becauſe of their toughneſs, and there are ſome other woods that do well enough. They ſhould be cut with a fork at the top, for it ſerves to give a ſupply to the head of the plant, and is of the greateſt ſervice.

The time of polling requires care, it muſt not be done before the ſhoots appear above ground; and on the other hand, if it be deferred long after they have ſhot, the plants will be checked, for the hop ſtops preſently in its free ſhoot, if it have not a ſupport. This work is to be begun after the ſhoots appear, and muſt be finiſhed before they are any where three foot high. This in a large ground is a ſharp buſineſs. The poles are to be fixed near each hill, three, four, or five to each, according to the rule before laid down: they are to be fixed in depth according to their heighth, and to the condition and expoſure of the ground. The richer the ground the deeper they muſt go, and the more they are expoſed the firmer they muſt be placed; indeed we have obſerved that a hop ground never is to be in an expoſed ſituation, ſo that the danger there ought not to be great. Nothing is ſo deſtructive as the riſing of a pole out of the ground: the breaking of one, though a troubleſome accident, is not near ſo bad; on this principle let him work, fixing them in the ground ſo firm, that they will ſooner break than riſe. They muſt always be placed ſo as to lean a little outward; though not much. It is natural to plant them ſlanting inwards, and ever ſo little of this is wrong. The hop requires a free air, and this is prevented by the poles bending in. Moſt of the diſorders of hops ariſe from the want of a free paſſage of air. If the poles ſlant inward ever ſo little, the weight of the hops will ſoon make it more, and they will cloſe at the top like a canopy: the conſequence of this is a certain taint in the hops.

To prevent this we order the poles to be fixed ſlanting a little outwards; but if they ſlant too much the weight of the hop will lean them down the other way, which is alſo wrong. Let the planter obſerve how the tops of the poles ſtand when he has fixed them; if they are a very little more diſtant at the top than at the bottom they are right, not otherwiſe. They ſhould be made alſo to lean a little toward the ſouth. This gives the ſun opportunity to ſhine in among them; which is of the utmoſt conſequence. Hops perſpire a great deal, and that damp vapour is apt to hang amongſt them. This taints them, and is the origin of many of their diſorders. The ſun ſhining freely in, diſpels this and warms the plants; it keeps them from damage, and aſſiſts the growth and ripening of the fruit. This leaning however muſt be but moderate: if great it prevents the very intent wherewith it is done, for the plants will obſcure one another. A pole which leans a little will bear one third more hops, than one under all the ſame advantages in other reſpects, that ſtands quite upright: but of this I can aſſure the planter, from my own experience alſo, that a pole that leans too much will yield fewer hops by one third than one which ſtands perpendicular; and beſide the defect in its own bearing, will hinder that of others. There is another ſubſtantial reaſon againſt the too great leaning of an hop hole, that is, the danger of its breaking, or of its tearing up, when the weight of the hop bears upon it.

CHAP. VIII.

Of inſpecting the polling.

AN accident in the polling of hops, if ſeen in time, is eaſily remedied. If upon the ſhooting of the hop at ſix or ſeven foot high, it be ſeen to be over-polled, that is, if the pole be ſo tall that it will be apt to carry it up in length, and prevent its fruiting well, it may be unwound from the pole, that may be taken up, and another ſet in its place, and the hop brought carefully round it: it will take to it as naturally as to the firſt. If it be ſeen, from the free growing and promiſing aſpect of a plant, that it is under-polled, or that it will bear a taller and ſtouter pole, it may be unwound, and ſuch a one ſet in the place of the other.

Let the planter inſpect alſo the condition of his poles, as to their firmneſs in the earth; eſpecially in places where the wind has moſt power. When he ſees any in danger, let him order a man with a rammer to force down the mould, on the ſide of the pole oppoſite to the wind, which will enable it to reſiſt the efforts. Let him have ſpare poles of different ſizes, not only for the replacing ſuch as are too ſmall or too large for their plants, but for the ſupplying the place of ſuch as ſhall break. This muſt ſpeedily be remedied. A hop plant that is ſuffered to lie upon the ground, will yield very little. Let him be ready not only to remedy ſuch accidents, but to prevent them. He will ſee where a pole is over-burthened; and let him not ſtay for the accident, but place in a ſpare pole to ſupport the other. Finally, where he has not perceived in time, that a hop was under-polled, but ſees it requires a taller, when it is too late to unwind it, let him place a ſpare pole near the other, and tie the hop to it, that it may have a freſh ſupport, and room to ſpread to the greateſt advantage.

CHAP. XI.

Of the tying of hops.

IT will be time to begin tying by that time the poles are all well in the ground: for the proper time to begin to lead the plant is at about a yard high. Let it be conſidered what each pole may bear, and ſo the plants proportioned to them. Let each ſhoot be led to the proper pole, which is uſually the neareſt, and let it be wound once or twice about it, in a direction according to the courſe of the ſun, for the heat naturally draws the ſhoot that way. When it is thus fixed to the pole it is to be tied round, to keep it there. Any ſoft matter does for this purpoſe; a piece of baſs, or withered ruſh, or a fragment of yarn. Let them be tied in two or three places, but let a great deal of caution be uſed in doing it, that they are not preſs'd, for the young ſhoots are tender. The heat of the day is the beſt time for the doing this, for in the morning, being full of juice, they are brittle: the heat of the ſun evaporates ſome of it, and they then will better bear a touch.

After this there muſt be no more tying, but the plants will ſtill require guiding, to keep them properly to the poles. We ſhall be now advanced to the ſecond ſtage of growth: our hops which have been tied ſome little time, will continue ſhooting very quick; and in general, if they have been carefully wound and tied, they will follow the courſe intended round the pole, freely and favourably. There may have been leſs care taken of ſome, and there will be ſome plants luxuriant and very croſs-grained, that will ramble from their poles, and hang wild and drooping. Theſe muſt be ſet right with the hand, for the firſt week, or ten days: toward the end of April the planter muſt himſelf go over his whole ground again, and ſee what farther is amiſs in the ſame way. The tops which ſtraggle from their poles, will now be above the reach of his hand; he muſt therefore take a forked ſtick, of five or ſix foot long, and with this turn and direct them properly to the poles, which they will readily enough take to when once put round, though they had ſtraggled naturally ever ſo much from them.

A fortnight after this, that is, toward the middle of May, let him go round once again, with the ſame deſign. His workmen muſt have general orders to rectify what is caſually amiſs, from day to day; but theſe are the periods whereat he ſhould go through the whole himſelf. When we adviſe this compleat attendance, we ſuppoſe the ground to be but of a moderate extent, and the planter not much preſſed by other affairs. When the ground is larger, and the owner has buſineſs that will not permit himſelf to attend, he muſt depute ſome careful and faithful perſon; and ſtill follow at times with his eye, what he does not execute with his own hand. At this inſpection in May, the greateſt care is required, becauſe it will be the laſt time of going over the ground; and becauſe faults at this time are of worſe conſequence than any other. He will find ſeveral plants that have ſtraggled from their poles, or that grow croſly ſince his laſt reducing of them. They are very ſtrong at this ſeaſon, and the leaſt fault encreaſes to a great one preſently, therefore let him go over them now with redoubled care. Neither his hand nor the ſtick will now reach them; whoever does the buſineſs muſt be followed by a labourer with a ladder, with a back to it, and this muſt be ſet down againſt the pole where there is any thing amiſs: every fault is to be thoroughly rectified, and they are then to be left to themſelves for a month.

CHAP. X.

Of clearing the ground and raiſing the hills.

THIS is an article which many practiſe too ſlightly. The hops are at a good growth toward the latter end of May, and being directed rightly in their courſe along the poles, they are prepared for a beneficial crop. We are now to proceed to the ſhortening the plants, but as it is a month before that is to be performed, it will be proper to conſider the condition of the ground, and the work that is to be done in the mean time below. The earth is to be ſtirred from time to time between the hills, and weeds are to be deſtroyed as they riſe: this is a general direction, but we are to come to particulars in this place. We have ſpoken of hills in the hop ground: that name is given to them in conſideration of what they are to be, rather than what they are in ſo young a ſtate of the plantation as that we have hitherto deſcribed; they as yet riſe only two or three inches above the level of the reſt, and are of a ſmall diameter. We ſee them larger in old grounds, and we are now about to enlarge them in our new one. Holes were dug for the planting, theſe were filled with compoſt, four of the ſets were planted at the four corners of each hole, and the earth was raiſed two inches over their tops, which were on a level with the ſurface; therefore the ſpots where they now ſtand are a little raiſed, and the level ground between is plain, as the harrow left it.

In this condition we ſee it in the beginning of June, and we then are to begin to give it more the form and appearance of an older hop ground. After the firſt ſhower let a number of labourers be ſent in, with an overſeer of the work; he is to ſet them to pare off the ſurface of the earth between the hills, about two inches deep: himſelf is in the mean time to be at work at the hills. He is with a careful hand to cut away all the ſuperfluous ſhoots of hops, and thoroughly to deſtroy all the weeds that riſe upon the hills; this earth which the labourers pare from the ſurface, is then to be ſhovelled to the adjoining hills, and carefully laid upon them. In this manner they will be encreaſed both in height and breadth, and the ground will have more appearance of what it really is. We mention the ſpade for this purpoſe, becauſe it will ſuit a moderately large ground. In a very ſmall one the handhoe will do; and in a larger the horſehoe, or hoe plow, is beſt of all. It is the beſt method to ſet out with a large piece of ground at once, and to prepare it for this inſtrument by the diſpoſition of the hills as we have directed; there is no article in which it is more largely ſerviceable; nor will any hop ground ſucceed ſo well nearly, as one that is ſo managed. Whichever method be taken, the work is to be conducted in the ſame manner, the hills are to be raiſed, with the earth thrown up, and the weeds to be deſtroyed. This is to be repeated once in three weeks, during the ſummer, in the ſame manner; always taking the advantage of ſome rains: for the earth cuts better, and every thing is more compleatly done at ſuch a ſeaſon. This perfectly kills all weeds, and the earth added from time to time, keeps the hills moiſt, and gives nouriſhment to ſuch new roots as ſhoot from the upper part of the ſet.

CHAP. XI.

Of ſhortening the hop plant.

THIS is much more eſſential to the ſucceſs of the plantation than ſome imagine. It depends upon a plain and certain principle in vegetation, that in order to promote a plant's bearing a great quantity of fruit, it is not to be ſuffered to ſpread too much into leaves, or to riſe too much in height. We left our hops at the end of May conducted along their poles; a full month they will be growing in length, but at the end of that time they ſhould begin to branch. Many of them will naturally, but ſuch as do not, muſt be put into the way of it, by taking off the top ſhoot. Some prevent the ſhooting farther of the ſtem at this time by turning it from the pole, and this ſometimes anſwers, but it is not ſo certain or ſo ſpeedy a way as the other. The ladder with its ſtay is to be brought into the ground again, and ſet againſt every hill; ſuch plants as have begun to ſpread, are to be left to nature; for the branches will draw the nouriſhment, and there will not be any abundant quantity ſent into the top ſhoot. But where nature puſhes all her ſtore that way, and there is no appearance of branches, the bud or top of the ſhoot is to be pinched off. This ſtopping its progreſs that way, will give all the ſap to new ſhoots and branches. The more of theſe there are the better; and as they ſeldom grow much till toward the end of June, they are then prevented from being luxuriant by the great quantity of ſap that is ſent to the fruit.

This is a proviſion of nature in favour of the planter, but he muſt favour it, otherwiſe accidents will interfere and prevent much of the advantage. About midſummer, the hop plant begins to branch: but if a rainy ſeaſon, or any other accident tend to interrupt this, and continue its growth in length, he is to ſtop it by pinching off the bud. A plant that would have run into a uſeleſs ſtem, or when there were branches formed, would have extended them to a great length, at the expence of what was to be of value, will by this management be thrown into a proper courſe, its ſtem ſhortened, and the branches ſtopped in their growth till every part be full of buds for fruit.

The planter is only to obſerve their ripening: in this he is to wait the courſe of nature, he can do nothing to aſſiſt her; and he is only to watch that he may take the moſt favourable opportunity for gathering thoſe fruits, the free growth of which he has promoted by his induſtry and care.

CHAP. XII.

Of the gathering of hops.

HOPS begin to flower about the laſt week in July: in a fortnight after this the fruit begins to form itſelf: this is called the belling of the hop, and it is to be expected in the beginning of Auguſt: from this time three weeks, in a good ſeaſon, compleatly ripens them. So that the planter may expect them in condition to gather in very favourable ſeaſons, in the end of Auguſt; in middling times, in the beginning of September; and in the worſt, ſoon after the middle of that month. The owner muſt watch carefully for this ripening: let him begin the laſt week in Auguſt to examine them daily, and ſo continue till he find them fit for gathering. The marks of their ripeneſs are theſe. Firſt they change colour. This is a ſure token that their maturity is coming on: after this they begin to ſmell fragrant and ſweet; in a few days after the ſeeds upon examination will be found turned brown. Soon after this the hop will eaſily fall to pieces.

Theſe are the four ſtages of ripening; in the firſt and ſecond that period is coming on; in the third, it is perfect; that is, when the hop has changed colour, when the ſmell is ſtrong, and the ſeeds are brown, it is perfectly ripe: in the fourth ſtage it is beginning to fade, for this is the courſe of nature. When things have attained perfection, the next ſtep is decay. The progreſs in the hop is very quick. When the owner perceives them to have all the ſigns of ripeneſs, let him get together all the hands he can for a quick gathering. One day hanging upon the plant after they are fully ripe hurts them, and if there ſhould happen a windy night, he may receive vaſt damage.

Many gather their hops irregularly, and by that ſuffer a great deal of loſs. The beſt manner is this. Begin in the centre of the ground: cut down four hills that ſtand together, cut the roots even with the ground, then lay the four hills, and the ground that is between them all level, in the manner of a floor: water this, beat it with a mall, ſuch as they uſe in turfing, then ſweep it and roll it with a heavy roller. This will be a fine level floor to pick the hops upon. To this they are to be brought from all parts of the ground, if it be a ſmall one; but in very large grounds, another or ſeveral others according to the extent, are to be made in different places, for the convenience of bringing the hops from every part to them. The hops are laid on this floor, and the pickers are to ſit all round it, and to pick them into baſkets; the floor is to be cleaned and ſwept once in three hours, and this way the work is continued till all is finiſhed.

In taking up the hop plants, let the perſon go round thoſe he is about to raiſe, with a long pole in his hand, with a ſharp hook at the end of it: let him obſerve where the tops of thoſe poles he is about to take up, grow entangled with others, and with this hook cut all theſe gently aſunder. Every thing is to be done with care and caution, and if this ſhould be omitted, the ſtalks would pull one another, and ſhake off the fruit in removing. When the plants are thus cleared, he is to cut them off at the bottom. It is a common cuſtom to cut them near the ground, but this is a great error. The hop is in a condition of ſtrength at this ſeaſon, vaſt quantities of ſap have riſen for the filling of the fruit, and they continue riſing, ſo that in cutting the plant off near the ground, a wound is made that bleeds a great deal to the weakening of the root. The proper method is to cut them a yard from the root, and they muſt be taken up only as they are wanted, proportioning the quantity taken at a time to the number of perſons picking. As many plants ſhould be cut off at once as will find them employment a quarter of a day; 'tis hazardous to venture cutting up any more, for either a hot ſun, or a ſhower of rain will do them a great deal of harm.

When the plants are looſened from their intanglings at top, and cut off at bottom, they are not to be unwound from the poles, for they twiſt themſelves too cloſely, and too irregularly about them for that; the poles are to be taken up, and the hops picked off while the plants are on them. The method is to raiſe the poles out of the ground. The planter ſhould have a large pair of knippers, and a block of wood to lay near the pole, that while the opening of the knippers takes hold, their handles may have the effect of a lever. Theſe knippers may be of wood or iron, the latter is more expenſive, but better. They ſhould be made with very long and ſtrong handles, and ſhould open like a ſmith's tongs, but be well toothed on the inſide. Rock the pole about with the hand, and lay the block of wood near it: then the points of the knippers are to be thruſt into the ground open, to take in the pole, and the handles are to reſt upon the block. When they are cloſed, and have good hold, the pole is to be raiſed out of the ground by bearing againſt the block. The wooden inſtrument for this purpoſe muſt be a large, long, and ſtrong lever, ſplit and kept open at the end. There muſt be iron teeth in this open part, and it is to be uſed exactly as the former. The hop poles ſhould have a fork at the end for the better keeping the top of the plant, but for the common way of picking upon the floor, it is beſt they ſhould not, becauſe they come the eaſier off when the end is ſingle.

The picking of hops muſt be done clean: fragments of ſtalks diminiſh their value. The little theſe foulneſſes add to the weight, is of no conſideration compared with the reduction they occaſion in the price. There is a diſpute among the planters at what exact degree of ripeneſs it is moſt profitable to gather hops. When hops are but moderately ripe, they are of a better colour, and they preſerve it when dry, and at the ſame time they are ſure to retain all their ſeeds, in which their greateſt virtue lies: this has led many away at once to the reſolving to gather them in this ſtate. The advantages are certain, and apparent; but let us examine the other ſide of the queſtion. The hop does not dry to ſo fine a colour when full ripe, and it naturally drops ſome of the ſeeds; but on the other hand, the full ripe hop has its full ſubſtance, which the other has not: and as it is leſs watery, it does not loſe ſo much weight in drying. Five pounds of moderately ripe hops yield a pound dry; and four pounds of full ripe ones do the ſame. Therefore though the others bring a large price at market, yet unleſs it be larger by that difference, the advantage will be in letting the hop ſtand to its full ripeneſs. The planter may take his choice.

CHAP. XIII.

Of the drying of hops.

THIS is to be done by a kiln, and we are to caution the planter to be very quick in doing it. No time is to be loſt in the picking after the hops are cut up; and when they are picked none is to be loſt in drying them. Their lying but a little while together will heat them: the firſt effect of this is the loſs of their colour, the next their ſmell. Few let them lie long enough to incur the laſt damage, but the former is too frequent, and it is never to be remedied. It may happen that the kiln is full when a great many are picked and ready for drying. This is to be avoided as carefully as poſſible, by proportioning one part of the work to another: but if it happen, the method is to ſpread them very thin upon the floor of ſome covered place where there is a thorough air, that what drying they thus get naturally may be regular. A ſmall quantity of hops will dry compleatly thus; and a larger will get no damage in lying a day or two; and it muſt be very bad management indeed if the kiln is not by that time ready. Nothing is ſo eaſily damaged as the hop in drying: and all the care beſtowed in the raiſing of it is thus rendered ineffectual; for the price is reduced at market, and the value alſo for home conſumption. The merit of the hop is its perfect fragrance and fine colour, and theſe can never be preſerved but by the moſt careful manner of curing.

Let the planter be cautious not only that his hops be dried well, but that they be all dried alike. If one parcel differ from the reſt, let him keep them ſeparate; for one pound of ill dried hops, mixed with fifty of the beſt preſerved that can be, will deſtroy the true and rich ſmell of the whole. It is a practice in ſome of our hop countries, to dry them in a malt kiln, upon a hair cloth. In Flanders they build a kind of kiln on purpoſe; and in ſome other places they alter the malt kiln for this uſe: we ſhall give the planter his choice of theſe ſeveral ways, but not without pointing out to him which deſerves the preference.

CHAP. XIV.

The Flemiſh manner of drying hops.

THE method uſed in Flanders is to build a kiln of brick; which is a room of about ten foot wide. The door is made on one ſide, and the fire place is in the center, and for a room of ten foot, this is fifteen inches wide in the clear, and ſo many deep, and its length within five foot that of the room; it is to run all along the middle, and to terminate two foot and a half from each end; that the perſon who has the care of the work may go round it: or it may be free only at one end for a paſſage, and be made in the manner of the fire place of our common malt kilns, the fire paſſing out at holes on each ſide. This fire place muſt be made on the floor: and four foot above the top of it is to be the bed, whereon the hops are to lie. This muſt have a wall of three or four foot high, to keep them from falling off. Adjoining to the kiln there muſt be a room into which the hops are to be put when dry; and a window is to open out of the place where the bed is, into this room, that they may be ſhovelled through without trouble. The beſt floor for the bed is made of rails like our pantile laths, they are to be an inch ſquare, and perfectly well planed; and they are to be placed a quarter of an inch aſunder, that the heat may freely paſs through, and the ſmalleſt hop not fall out. There generally runs a beam croſs the bed in the middle, and the rails are all let into that even with its top.

When this kiln is prepared, the hops are to be thrown in as they are picked, one baſketful after another, till the whole bed is full, and they lie a foot and half deep upon it. They muſt lie as they fall, and not be preſſed down any way: only it will be proper to draw a wooden rake over the ſurface, that they may not lie thicker in one place than another; but this muſt be done lightly. When the hops are in, the fire is to be kindled. In Flanders they burn dry wood, and that often but of an indifferent kind; but it is much more proper to uſe charcoal, which we would adviſe the planter to burn himſelf, with a particular care, for that purpoſe.

The Flemiſh hops are commonly cenſured for having an ill ſmell; and this is owing entirely to the practice of burning wood under them. Let the clean fuel we have directed be uſed, and that fault will be perfectly avoided. The fire muſt be a pretty good one, but it is not to be continued all along the fire place, it muſt be only at the mouth of the furnace; for being well kept up there, the air which paſſes through will convey the heat to every part of the kiln. This fire is to be continued till they are thoroughly dry, but this muſt be carefully regarded, for they ſometimes do not dry equally.

To try whether they are dry enough, examine them at top; if they are thoroughly dry there they will rattle on drawing a ſtick over them; and if they are thus dry in ſome places, and leſs in others, they muſt be thinned where they are dampeſt, throwing what are taken off upon the dryeſt places: thus the fire being continued they will ſoon be all finiſhed.

The great care is to keep an equal quantity of fire all the time. When they all appear thoroughly dry by their colour, aſpect, and rattling, they are to be tried by breaking the inner ſtalk, if that ſnap freely they are as they ſhould be. If they are not found to be perfectly cured, the fire is to be continued a little longer: if they be finiſhed it is to be let out, and the hops are to be ſhovelled out at the window, into the room prepared for receiving them. After this the floor of the kiln is to be ſwept, and what ſeeds and broken hops have fallen through the railing, muſt be got together and put to the reſt. Then a freſh quantity of hops are to be put in, and the whole procedure repeated.

CHAP. XV.

The way of drying hops in a malt kiln.

THIS method comes eaſier than the other, where there is a malt kiln in readineſs, becauſe the trouble and expence of a particular building is ſaved. The ſtructure of a malt kiln, is ſufficiently known. The manner of employing it for the drying of hops is this: a hair cloth is to be uſed as a bed for the hops, and they are to be ſpread upon it ſix inches thick. They are to be thus kept over the fire made in the uſual way, till they are half dry; then they are turned with a ſcoop made for that purpoſe, the lower part upwards, and the upper part, which was leaſt done, loweſt; and thus they are to lie till the whole quantity is thoroughly dried.

When they are done the hair cloth is removed, and they are thrown into a room; where they lie ready for bagging. In favour of this method nothing can be ſaid, but that for ſmall quantities, where there is a malt kiln near, it may ſave expence. The hop branch however is ſo profitable, that we ſhall adviſe the farmer to ſet out in it boldly, taking a large ground, and not ſparing the firſt expence: ſo that this expedient will be of little ſervice to him. For thoſe who uſe this, they are to be adviſed to take great care in the turning, to do it gently; and to uſe clean fuel; and keep the heat uniform and equal during the whole time.

CHAP. XVI.

Of drying hops in a malt kiln fitted to the purpoſe.

A Better method of drying hops, is by preparing a malt kiln for that purpoſe. In the Flemiſh way the fire muſt be continued longer than in any other, becauſe there is ſo large a body of hops to dry; and as they are never turned, the under ones will be more done than the upper, and muſt be over-done in the drying the upper ones ſufficiently: therefore there is more time, more charge in watching, and more fuel than need be; and a great part of the hops are too much dried, by which they loſe both weight and colour. In the way by the malt kiln and hair cloth, the turning is a great inconvenience, for many of the hops are ſhattered and broken; to which not only the motion of turning, but the roughneſs of the hair cloth contributes; and a great deal of the ſeed is ſcattered and loſt by the motion. Theſe are leſs inconveniences than thoſe in the Flemiſh way, but they are very great. A great deal of the virtue of the hop is in the ſeed, therefore this is a damage; and the breaking it always injures the price at market.

We ſhall attempt to give a method that has been practiſed in ſome places many years, and the advantages are ſo great, that 'tis pity it ſhould not be univerſal. Let there be a kiln, the lower part of which ſhall be, in all reſpects, the ſame with that of a common malt kiln. A common malt kiln may be uſed for this purpoſe, with the following additions; or there may be one purpoſely erected in the ſame manner. When the kiln is ſo far prepared, the bed for the hops is to be thus made. Frame together a quantity of ſlips of deal well planed, let them be three inches broad, one inch thick, and of ſuch length as ſuits the kiln. Let theſe be laid checkerwiſe one over another, at four inches diſtance; let thoſe which lie uppermoſt be let into the lower, and the whole ſurface kept ſmooth and perfectly even. This frame muſt be ſupported by joiſts ſet edgewiſe, and ſo placed as to lie in a true level. Then prepare a covering for it, of that ſtrong kind of tin called double tin. Let the meaſure be carefully taken, and the plates of tin well ſoldered together, and let the laying of the ſeveral plates be ſo contrived, that the joints fall upon the middle of the ledges. When the frame is well tinned let there be four ſides of boards made to it. Three of theſe are to be fixed, but the fourth muſt have hinges: it is to be hooked up in the time of uſing; but when the hops are dried and are to be removed, it is to be let down, ſo that they can be puſhed gently off without breaking. When the bed is finiſhed let there be a cover prepared for it. This muſt be exactly of the ſame length and breadth, it muſt be made of boards, and framed together; the lighter the better. The face of this muſt be covered with tin plates, laid on evenly. This cover is to be hung flat from the roof of the kiln, at a conſiderable height above the bed, bnt ſo contrived that it may be let lower upon occaſion, when it is wanted. The bed being thus prepared, and its cover hung over it, conveyances for the ſmoak muſt be made at the ſides and corners of the kiln, and then the whole is ready.

There will be ſome expence in fitting up this kind of kiln at firſt, but it very richly anſwers. Leſs time and leſs fire are required, and almoſt any kind of fuel will ſerve. In the Flemiſh way there is a great error, in uſing foul fuel, but in this method leſs caution is neceſſary. There the ſmoak or vapour of the fuel lodges among the hops as they are drying, becauſe the bottom of the bed is open; but here, as that is covered with tin, the vapour never gets among the hops. Suppoſe a parcel of hops picked and ready for drying, let them be carefully emptied into this bed by baſketfuls, and ſpread a little about by the gentle motion of a ſtick, in the hand of a perſon who can go along the ſides of the bed, and from one part or other reach over it; the hops are to be ſpread about till the bottom of the bed is covered eight inches deep with them pretty evenly. The fire is then to be lighted and kept up equally, till the lower part are dry, and the greateſt quantity of the moiſture is evaporated from the whole. Then let the cover be gently let down till it comes within ten inches of the ſurface of the hops, the fire being all this time continued as at firſt; the effect of this cover will be like the dome of a reverberatory furnace, it will reflect back the heat upon the hops, in ſuch manner that the top part ſhall ſoon be as dry as the bottom.

When all are dry enough the hinged ſide is to be let down, and being ſupported ſlanting downwards with a gentle deſcent from the level of the bed, the hops are to be puſhed out carefully with a board at the end of a pole: and the ſide being put up again all is to be continued in the ſame manner, with a freſh parcel of hops. To ſave the expence of this cover, a flat ſcoop may be uſed to turn the hops when they are two thirds done, but this is ſome labour; and all motion hurts the hops. The expence of the cover need not be any thing like that of the bed, for rough boards will ſerve, and common tin plates nailed on will perfectly well anſwer for the facing of it. In this manner the price is moderate, but if it were much more it would be eaſily ſaved in a little time, in the advantage the hops get by drying without turning.

CHAP. XVII.

Of the bagging of hops.

WE ſhall now proceed to the packing the hops up in bags. A room is to be prepared for receiving them from the kiln. This muſt be dry and airy.

The hop is not to be packed up directly from the kiln, for it is then very brittle. They would be brittle, and would have too much heat among them, and this not going off freely would damage them. They muſt lie in this room till they have thoroughly cooled; and they will, in that time, grow ſo tough, that they may be preſſed in packing without fear of hurting them. Three weeks is the leaſt time they ſhould lie for this purpoſe, and according to the ſeaſon, and other accidents, it will be proper ſometimes to allow them a month. If the weather be moderate they will come to a proper toughneſs very well, lying open; but if it be hot and dry 'tis beſt to ſpread blankets over them. The room into which the hops are received from the bed of the kiln, ſhould be pretty near the ſame level with the bottom of the bed, that they may not be hurt by falling too far: this alſo anſwers another purpoſe; for being at this height there may be another room under it, which is quite neceſſary for the bagging.

In the middle of the floor of the room into which the hops are received from the kiln, there muſt be opened a hole communicating with the room underneath. This muſt be four foot long, and three and an half wide. The bag into which the hops are to be received muſt have a hoop faſtened to its top, the edge all the way round is to be turned over the hoop, and faſtened with packthread in a large needle. This hoop is to be of ſuch a ſize that it cannot go through the hole. The bag being thus prepared is to be let thro' the hole, the hoop ſupporting its top remaining above; and this is to be very well faſtened in, becauſe it is to bear the weight and force in the treading. The bag being let through, toſs in a ſmall quantity of hops, and then going into the lower room, gather up ſome of them to the corners, and tye in a ſmall parcel into each corner, with a packthread put ſtrongly round. Theſe reſemble toſſels or pincuſhions, and are very ſerviceable afterwards in managing the hops. When this is done let more hops be thrown in, and let the man who packs them get into the bag, diſperſing them evenly, and treading them down as faſt as they are thrown in: this is to be done till the bag is full. Then it is to be unripped from the hoop, and its top ſowed firmly together, making a couple of little bunches at the corners, as there were at the bottom. In theſe bags the hops are ready for the market, and if the owner have a mind to wait for a more favourable time for ſelling them, they will keep in a dry room without damage.

CHAP. XVIII.

Of the management of the hop ground after the hops are gathered.

WHEN the picking is over clean off the ſtems of the hops from the poles, and lay theſe up dry for another year, the beſt way is to place them in a heap under ſome ſhed. In large grounds 'tis worth while to erect a ſhed for the ſeaſon of picking, that this may be done under cover: the ſame building will then ſerve for keeping the poles till ſpring. Some raiſe them in heaps hollow within, and ſtanding like a pyramid, but the outſide poles are damaged in this way, and the tops of them all. Others lay them in heaps expoſed: only ſpreading the dry plants over them, but this rots them. The method of houſing them is much better; and the poles come ſo dear, and the ſhed may be raiſed for ſo little price, that 'tis worth while to do it only for that purpoſe. The ground is to be left untouched till ſpring: but it will be needful to give it a good dreſsing then; and the manure ſhould be got ready during the dead ſeaſon. As the planter uſed a compoſt for receiving his ſets at firſt, he is to follow the ſame method in dreſſing the ground afterwards. Hops will be much improved by dung; but they cannot bear ſuch as is new: it will utterly deſtroy them. Upon the proper condition of this manure, and the due dreſſing of the ground, will depend the ſucceſs of the next year.

Mix ten load of dung, that is at leaſt a year old, with two load of common garden mould; and half a load of ſharp ſand: ſtir and work all this thoroughly together in November, and let it lie till ſpring. The laſt week in March plow the ground lightly over, then bring out all the old haulm or dry ſtems of the hops that were taken off the poles the laſt autumn, lay it in heaps in different parts of the ground, and let labourers ſhovel ſome of the ſurface of the ground upon the heaps. Then ſet them on fire and reduce them to aſhes. Theſe aſhes will lie in heaps, and let the compoſt laid together in November, be now brought into the ground, and equal quantities of it laid on every heap. Let a labourer mix the earth and aſhes with the compoſt. And this becomes an extreamly rich manure, and agrees perfectly well with the hop. As ſoon as this mixture is prepared, which will probably be within the week, or in the very beginning of April, let the hills be opened, and they are to be refreſhed with it.

It is the cuſtom of many to dreſs the ground earlier, but experience has ſhewn us this time is better. The hop is a plant that ſhoots late, and 'tis happy for the planter that it does; for when a forward ſpring brings the ſhoots early, there generally happen ſome injuries to them. This late dreſſing keeps them backward in ſpringing, and at the ſame time thoroughly deſtroying the weeds ſo late, they do not riſe of a conſiderable time. The manner of doing it is this. The hills are to be one after another pulled down, and the roots examined. Theſe are of two kinds, the old and the new; the old are all to be preſerved, and the new which ſhoot ſideways are to be cut away. The old roots are reddiſh, and the new are white, ſo that the colour eaſily diſtinguiſhes them. But let the planter remember that all the new roots are not to be cut off, but thoſe only which ſhoot ſideways: ſuch as run downwards are to be preſerved. The ſame diſcretion is to be uſed with the ſhoots. The old ſets are to be preſerved, and here and there a good young one that is well placed, is to be left with them, the reſt are to be taken off; they are ready for planting in new ground if wanted: if not let them be thrown away.

When the roots and ſets are cleared, let the earth that was taken from them, and that removed by the breaking of the hills, be thrown into the ſpaces between the hills; and let the hills be made up to a due height, with the mixed compoſt and aſhes, and calcined earth; which together makes an excellent manure. The young ſhoots are to be cut off at an inch from the old one this firſt dreſſing, but every year afterwards they muſt be cut away cloſe. It will often happen that the ſet of a good hop degenerates into a wild kind: in this caſe let the hill where this ſtood be marked at the time of gathering; and at this ſpring dreſſing let it be entirely taken to pieces, the former ſets removed, and let ſome of the beſt of thoſe produced by the good kinds be planted in their place. The hills muſt not be made too high at firſt, becauſe the ground is to be pared in the ſummer, and theſe parings are to be laid upon them. If they were too high at firſt, they could not bear this addition, the uſe of which we have ſhewn already.

Some of the hops will be ſhot up: but he is not to regard this. The cutting off a top at this ſeaſon does no harm: but this being once done, and the hills made, let him take care no injury is done to them afterwards. Vermin and poultry are to be kept off: of all birds he is to be the moſt aware of the gooſe.

CHAP. XIX.

Of dreſſing an old hop ground.

THE hop plant comes to its full vigour the third year, and will laſt a great while; but time wears out the ſtrength and heart; and ſometimes neglect will bring the ground in a few years to the condition it would have fallen into neceſſarily after this full period. In either caſe the ſame method is to be followed. The dreſſing of the ground muſt be begun in winter. Let the whole ſpace between the hills be plowed up with a four coultered plow, that it may be cut deep and thoroughly broken: and let there be in readineſs ſome of the compoſt before deſcribed. When the ſpaces are broken up, let the hills be pulled down as far as can be with ſafety to the plants, and let their earth, and ſome of that which is neareſt them in the ſpaces, be thrown to a diſtance, and bring in the compoſt to ſupply its place about them. This deep plowing will deſtroy weeds, and the addition of new ſtuff will give the hops the advantage ſo far, of not only new ground but very rich. There is another benefit in this method: the hop is at once encouraged to ſend out new roots, and nouriſhment is provided for them.

To explain this, let us ſet before the reader the real ſtate of a decayed hop-ground, as it would appear if the whole were expoſed to the eye. Here are a number of hills with ſtrong old plants upon them, and here is a great extent of ground between and about them, which is hard at a little depth. The ſurface of this ground may have been ſtirred to four, five, or ſix inches deep, but never more ſince the ground was made: under that it is perfectly firm, as if never broken by any tillage. The roots of hops do not ſpread near the ſurface, nor ſhould be ſuffered to do ſo. Their common way is to ſtrike deep into the earth, and there to ſpread every way to a great diſtance. This is their natural courſe, and in this they ſhould be encouraged. In an old hop ground the roots have gone their depth, and they cannot ſpread becauſe of the hardneſs of the earth between. The mould in the hills is all they have any advantage from, and that is renewed too ſuperficially. In this caſe the hop ſends its roots but a little way, and they lie in an earth they have long before exhauſted. This is the occaſion of their decay. By removing them into a new ground, the ſame plants ſucceed greatly, nature therefore is not exhauſted in them. We have ſhewn how they come to loſe their vigour: and we have ſaid at firſt, that at ſuch time the common practice is to ſet them in a freſh ground.

We have ſet this plain ſtate of the caſe before the planter, to ſhew him that this is the wearing out of the ground; and as we are about to propoſe the renewing it by tillage inſtead of giving it up, we ſhall ſhew the reaſons. We have adviſed planting the ground with fruit trees in time: ſo that the perſon who chuſes to give up his ground at the end of ten or a dozen years, may do it to the beſt advantage: but we here ſhall give him the choice of reſtoring it to its vigour, and continuing it in ſtrength from generation to generation.

CHAP. XX.

Of reſtoring a decayed hop ground.

IN the condition wherein we have deſcribed the hop ground, the common practice is to give it up; and this was reaſonable upon the old footing of agriculture: but now we are upon a new and better ſyſtem. On taking up a root of an old hop plant in one of theſe decay'd grounds, the fibres hanging from it will be found few in number, large, and often mouldy, or decayed at their ends. This is a ſtate in which they can ſupport the plant but poorly. The large roots in all growths ſerve to receive the nouriſhment from the ſmall ones, and convey it to the reſt of the plant; but 'tis the ſmall ones that abſorb it from the earth. There are few of theſe, therefore the others in a manner loſe their uſe, and the plant is poorly nouriſhed. There are no ſmall roots to penetrate into the earth; nor any ground in a condition to receive or ſupply them with nouriſhment. Therefore we muſt do two things: we muſt occaſion the plants to ſend out more roots, and prepare the earth to give them free paſſage, and afford them nouriſhment. How we ſhall make the plants ſend out new roots, the practice of every gardener ſhews us. When he is to remove any plant, he cuts off the ends of all the roots: there immediately ſtrike out a great many new ones; and theſe being ſmall are in a condition to imbibe nouriſhment. The other article may be learnt alſo by the ſame familiar example. When the gardener has cut the roots, he opens a hole, and ſtirs up the ground about the place. This diſpoſes the mould to give free paſſage to thoſe new roots, and to afford them nouriſhment.

Let us apply the principles we have before delivered, and this familiar example to practice in reſtoring a decayed hop-ground. We ſay the earth is exhauſted, but that is a miſtake. All in the middle of the intervals lies hard and unpenetrated, and has done ſo for many years, no roots have got into this at any depth, therefore this is not exhauſted. The earth about the hills being exhauſted, is to be removed, and freſh and better matter is to be put in its place, and the others being thoroughly broken and divided by the four-coultered plow, will be ready to ſerve as new earth. In plowing the ground let the plow come as near to the hills as it can, and cut to the full two ſpit depth, particularly in thoſe places. This will cut off the ends of all thoſe roots which ſhall have penetrated ſo far within that depth, and the ground being rendered light and fine, will be ready to receive freely the new roots they ſhall ſhoot from their ends, and to afford them nouriſhment. In the ſame manner the ſpade will, in digging down the hills, cut off the decayed ends of thoſe ſhorter roots which never extended beyond the hill; and a perfectly new earth will be added here for them to ſtrike into, and for the ſupplying them with nouriſhment. Thus the roots will be nearly all cut off at their ends: they will be put in a condition to ſend out new ones; and there will be earth about them to receive and ſupply them with nouriſhment; and this is all that is required for the moſt perfect growth.

We ſee therefore that a ground thus treated ought to yield as well, and indeed better than a new one, becauſe of the eſtabliſhed growth of the ſets: and I may almoſt venture to affirm, that it will anſwer exactly ſo in practice. What I am propoſing to others I have tried myſelf in little; and am now practiſing at large. I mended one corner of my ground in this way, and it anſwered to the utmoſt expectation: I am repeating the ſame courſe in the whole ground, and have no reaſon to doubt but the ſucceſs will every where be equal. When the ground is once reſtored this way, the common horſehoe or hoe plow, called the horſe-break, is fully ſufficient.

CHAP. XXI.

Of watering a hop ground.

THERE remain ſome few particulars to be mentioned, as to the management of a hop ground. The principal of theſe is watering. It is not neceſſary every year; and happy for the planter that it is not, for 'tis a buſineſs of great fatigue: but ſometimes, whatever be the expence or labour, it will be found worth while to do it. This depends upon the ſeaſons. When nature follows her uſual courſe the planter need give himſelf no trouble to aſſiſt her; but he is to know what aſſiſtance ſhe ſhould afford, and when that is wanting he is to help her by art.

Thus ſpring is a ſeaſon in which there are ſhowers, nature intends this, and all vegetables require it: but there are ſeaſons in which the courſe of nature is interrupted: in theſe let the planter in the hop buſineſs aſſiſt her at whatſoever expence. No plant requires the ſpring rains more: ſome will do without them for the time, and recover afterwards when they fall, if ever ſo late; but if the hop be defrauded of its due watering in ſpring, it will be ſeen in the fruit in autumn.

We have obſerved, that in the choice of a piece of ground, the planter ſhould fix upon a place where there is water near. The time of watering is a material conſideration. It is not to the advantage of the hop to ſhoot early, becauſe the plant is by that thrown in the way of many accidents. The firſt ſeaſon for watering is juſt before the ground is pared, and the hills are made up. This will diſpoſe the hops to ſhoot vigorouſly when it ſhould; that is, when the hills are in a condition beſt to ſupport their growth. If the ſeaſon prove tolerably good, the trouble of watering concludes at this once; but if no rains fall in the following month, it muſt be repeated at the end of that time; and if the enſuing ſummer continue dry, it may be repeated once more about the time of the hops flowering. Nothing contributes to fill and perfect the fruit ſo much as a proper degree of moiſture at the right ſeaſons. A ſufficient quantity of water is to be allowed: to do it ſlightly is not to do it at all: the planter throws away his expence, becauſe he grudges to do what is ſufficient. The hop is a large plant, and great ſupplies both of water and earth are to be given it, or it will never ſupport itſelf to any advantage.

Every time the ground is watered, let the ſpaces be pared afreſh, and the parings added to the hill. The vapour of the water aſcending through theſe parings, mellows and ſoftens them, ſo that they become an excellent manure as well as ſhelter; and the weeds are deſtroyed by the ſame operation. Sometimes particular plants of the hop will ſucceed but poorly, or ſingle hills will dwindle when the reſt flouriſh. Let theſe hills be watered frequently with water in which pigeon's dung is mixed; making a baſon round the plants, that none may be loſt. If this does not ſucceed, let the hills be carefully opened, and ſome hog's dung mixed with rich earth, be put in about the roots. About November let the ground be particularly well dug round theſe hills, and they will equal the beſt of the others.

Having laid down the general method of managing the hop ground, we ſhall communicate to the publick certain improvements upon the common practice. They have come into our hands in the form of letters, from various perſons.

LETTER I.

On the choice of ground, and manner of planting.

SIR,

" If the experience I have had in the hop-way is of any uſe, I ſhall " be glad to ſerve you. If you expect a good ground, let it be free " to the air. I find wherever the air can't get through, hops blaſt, " and in the middle of the ground they ſhall be all ſpoiled, at the " ſame time they are quite good at the ſides. One great elm in a " neighbour's ground has ſpoiled me many a bag of hops, it ſtands " juſt where the air ſhould paſs; and there are two others behind it, " ſo that I am there quite choaked up: my hops for eight, ten, or a " dozen hills juſt there are many years ſpoiled, while all the reſt are " in good order.

" I find it inconvenient to have all my hops ripen at a time, for " there is no getting hands enough to manage them. For this reaſon " I now plant three ſorts; the early white, the long-white, and the " oval. The firſt of theſe ripens a fortnight before the two others, " and the oval is commonly a week later than the long white. So I " have three ſeaſons. The early-white don't yield a great crop, but " they come early to market, and fetch a price, ſo I find one thing " anſwers for another: and this I know, ſince I followed this way, " I have always more profit, than I uſed to have, and not half the " trouble. If others will do the ſame, they'll find the truth of what " I ſay.

I am, with reſpect,
Your humble ſervant,
ARTHUR COLLINS.

LETTER II.

On the planting and management of hops the firſt year.

SIR,

"Whereas it is the common way to plant four ſets of hops in a hill, one at every corner, I bethought me in planting a new hop ground, to try practices, and plant more: in ſome I put twelve ſets, three on each ſide, in other ſome ten, in ſome eight, and in others ſeven, ſix, five, and others four; in ſome alſo I put only three, and in others two, and in a few but one plant a piece, ſticking it juſt in the centre.

"By what I find after many years trial in this new-faſhion'd hop ground, our planters have not found out the right number. Where I have only one hop in a hill, it bears full as much as two in the common way; and where I have ten or a dozen, they ſtarve one another; and don't yield ſo much as four. Upon the whole, placing the hills at the common diſtance, each will very well feed ſix plants, if the ground be well tilled between, and they will yield every one nearly as much as one where there are only four. But ſuppoſe the ſix thus yield as much as five, when there are only four on a hill, ſtill it is gaining a great advantage.

"My ſingle plants are liable to feweſt damages, and the thickeſt planted to moſt: but I don't ſee any material difference in that way, between ſix and four on a hill. This I thought good to tell for the benefit of others: depend upon it ſix plants in a hill is the beſt number can be raiſed.

"There is one thing more it may not be amiſs to tell you of. We have a way here of loſing the firſt year of a new hop ground, having a notion that to let the plants bear the firſt year, weakens them for ever afterwards. I'll tell you how that is. If the ground be planted in ſpring, as ſome do it, then there is ſo little time between that and the hop ſeaſon, that there will be a ſmall produce: but the right ſeaſon of planting is the beginning of October, and in that caſe the ſets root before the cold of the winter, and have time to ſtrengthen themſelves in the ground for the ſpring ſhoot. They will therefore come up ſtrong, and as well as ſome ſpring-planted hops the ſecond year. In this caſe they will yield a very good produce the firſt ſummer, and it is a very idle and waſteful thing to neglect gathering of them. I have found it thus in many other things concerning hops: people follow one another's practice right or wrong, without conſidering that what is right in one reſpect, may be wrong in another."

I am, Sir,

Your humble ſervant,

LETTER III.

On the picking of hops.

SIR,

"I have found many inconveniencies attending the uſual way of picking of hops in the open ground, for which reaſon I have now

" many years built a place for that purpoſe. I am ſenſible the name " of building is enough to ſtartle people not uſed to theſe things, but " mine is only a ſhed: the coſt very little, and the convenience great " on many occaſions. My ſhed is only a top, two ends, and a ſide, " being open all the length one way; and the materials are of the " cheapeſt kind. The length is two and twenty foot, and the breadth " twelve. This conveniently holds two frames in the picking ſeaſon; " and at all other times it ſerves to houſe the tools, to put by " any thing like to be wanted, and in winter to lay by the poles. I " never have my poles above twenty foot long, ſo there is two foot " over room to hold them.

" In the picking ſeaſon I ſet up two frames lengthways in the ſhed, " and have juſt room for the people to ſit back to back between them.

" My frames are ſeven foot and a half long, and three and a half " wide; they are made of nothing but four poſts for corners, ſet " up firm in the ground, with a hair-cloth tacked over them, and a " couple of forks to hold up the poles. The poles are laid over " theſe, with the vines upon them, and the pickers work along " the ſides, and at the ends, picking the hops into the cloths.

" Thus I find no damage nor danger from wind, ſun, or ſhowers, " and my work in every reſpect goes on better than my neighbours.

" Many of them make the ſame ſort of frames that I do, removing it from one part of the ground to another; but I have always " found the fixed ſhed beſt, and mine are not ſmall grounds. The " poles are ready to be laid up, and there is no danger of accidents. " My hops are picked clean and dry, and they are not afterwards broke by tumbling about, for it is only taking up the ends " and ſides of the hair-cloth, and they are carried away as it were in " a bag directly to the kiln, where they are emptied into the bed for " drying."

S I R,

Your very humble ſervant,

R— R—.

CHAP. XXII.

Of flax.

THE value of flax is encreaſed by the eaſy manner in which it is cultivated. Scarce any produce may be made to bring in greater advantage, and none is ſo much neglected. We import from abroad at a great price, what we might raiſe as well at home. We have laid down in the preceding chapters, the method of managing hops: an article of difficulty, which yet in many places is executed with great familiarity: and we hope, from the light wherein we have ſet it, that it will be ſo in many more. What we have to ſay of flax, though we ſhall deliver its management as fully, will be comprized in a ſmaller compaſs, and the trouble of the perſon who ſhall be induced to raiſe it, will come in a much ſmaller and ſhorter way.

Flax is a ſlender, tall, and pretty looking plant. It is too tender to keep itſelf well upright ſingly, but in a field where it is ſown together in a body, nothing ſtands better. Flax is an annual plant. Its root is ſmall and fibrous; the ſtalk is ſmooth, and it riſes to three or four foot in height. The leaves are ſmall and narrow, and of a pale green: the ſtalk grows ſtrait and ſingle to the top, where it divides into three or four little branches, and on theſe grow the flowers, and after them the fruit, containing ſeveral ſeeds. The flowers are large and blue. Each flower ſtands in a ſmall cup, made of five pointed leaves: the flower conſiſts of five leaves; narroweſt at the bottom, ſo that the whole has the ſhape of a funnel. In the center ſtand five ſhort filaments, each having at the top a knob or button, ſhaped like an arrow's head; and in theſe is the young fruit, on which grow five very ſhort and ſmall threads, bending at their tops, and having no knobs or buttons on them.

In the hop thoſe ſmall knobs on the filaments, contain a duſt that impregnates the fruit, and perfects the ſeeds; they are of the ſame nature in all other plants, but in this, as in moſt, they ſtand together with the rudiment of the fruit, in the bottom of the ſame flower: whereas in the hop, and a few others, they grow in different flowers upon the ſame, or upon different plants of the ſame ſpecies. The huſbandman will not be diſpleaſed that we thus inform him of the nature of flowers; we would have him ignorant of nothing that relates to his profeſſion, and this is no idle curioſity: he who beſt underſtands plants, will beſt raiſe them. When the duſt from theſe buttons has ſhed itſelf upon the crooked filaments which ſtand among them, and which riſe from the young fruit, the leaves of the flower fall off. Although they are the gaudieſt part of the plant, they are of no other uſe than to defend theſe threads from injuries, while their duſt is ripening. The threads alſo fall off, and as in this caſe of the flax, ſo in all others, nothing remains but that rudiment of the ſeed-veſſel: this increaſes in ſize, and when ripe, is of a roundiſh ſhape, marked with five ſlight ridges, and terminates in a point. It contains ten cells, in which are the ſeeds: theſe are of an oval pointed form, ſmooth, flatted, and brown, and there is only one of them in each diviſion. This is the herb which affords our linnen. It has been known in early ages, the Greeks having called it by the ſame name, and uſed it to the ſame purpoſes: and it ſeems to have been originally a native of ſome of the Eaſtern countries, tho' it is not eaſy to trace the time of being brought into the north. At preſent 'tis cultivated in moſt kingdoms, and deſerves to be much more ſo in England.

CHAP.

CHAP. XXIII.

Of the ſeveral kinds of flax, and the choice of the ſeeds.

'TIS one thing to ſpeak as a botaniſt, and another as a huſbandman: the curious in plants reckon twenty kinds of flax, but the farmer needs to know only one. The flax juſt deſcribed is the only one raiſed any where for uſe. We ſee a kind of flax wild about the borders of fields in ſome places, and it has been diſtinguiſhed as different from the other, but it riſes from ſeeds of flax ſcattered by accident, and only differs in being ſmaller and weaker. In a crop of flax a great deal will depend upon the goodneſs of the ſeed; and this ripens poorly for a continuance in England.

Moſt of our neighbours import the ſeed of flax from Flanders: but it is better to get it from the eaſt. Every plant has its native ground on which it riſes to the greateſt perfection: its ripening the ſeed is the compleat perfection of its growth: and this will be beſt done where it is native. It is natural to ſuppoſe flax originally came from the eaſt, and it no where ripens its ſeed ſo well. For this reaſon we adviſe to get the firſt ſeed from the Levant. Enough of it is imported every year, only let him take care to enquire for the right ſort, and to deal with a perſon of integrity. When he has once a quantity of this, it will be ſufficient for ſome time: the ſeed of his own growth raiſed from this will be good three crops, if it ripen favourably, but by that time he will find it run weak, and he muſt have a freſh parcel from the ſame place.

CHAP. XXIV.

Of the proper land for flax, and the preparing it.

WHEN the huſbandman has his ſeed, he is to conſider on what parcel of his land to ſow it. To raiſe it to advantage, it muſt have the beſt ground that can be given. Flax, though a ſmall rooted herb, exhauſts a vaſt quantity of nouriſhment. Inſomuch that it will impoveriſh the richeſt piece of land in a little time, but it very well pays the damage. The field to raiſe it to advantage, muſt have a light deep mellow ſoil, the more like garden ground the better, and it will never ſucceed ſo well as when it comes upon a new piece of tillage. A rich loam is moſt proper: and 'tis much the beſt to ſow it on new broke up ground. The converting of paſture into arable, if the ſoil ſuits flax, is a very beneficial opportunity for ſowing it: but it will ſucceed very well upon a broke up ſaintfoin lay; for the flax roots ſhallow, and the ſaintfoin very deep, ſo that the ſurface of the ground is left unexhauſted. On ſuch a field, flax will yield a more profitable crop than any thing whatever; but to continue the benefit, he muſt change not only his ſeed, but his ground at proper ſeaſons, for the ſame land will not, with any management whatever, bear many ſucceſſive crops of flax.

Mr. Tull has ſaid, that by his method of hoeing between the rows, one piece of ground will maintain the ſame kind of crop ever ſo long. Flax, whoſe culture probably Mr. Tull had not experienced, proves the contrary; no culture or management whatſoever, will enable the ſame piece of ground to bear crop after crop for ſeveral years. We do not give this as a proof that the new huſbandry is not proper for flax; on the contrary, no crop whatſoever agrees better with it; nor is this to be raiſed any way with near the benefit that it is by the drill and hoe plow; but ſtill the ſame land will not continue to yield it well. Half a dozen crops are the moſt that can be got from a good field by this method: and it is not eaſy to get more than four by the common huſbandry. After this the field muſt be well manured for preparing it to raiſe ſome other crop, and the next ſowing of flax is to be upon ſome other ground.

The new huſbandry is better than any other method; but it does not come up to all that has been written of it.

The farmer has his ſeed of the right kind, and has fixed upon the piece of ground where he will ſow it; the next thing then is to prepare for its reception. The great points here are two. To break the earth very fine, and to keep down weeds. We ſuppoſe the piece of land to be new broke up, it is to be wrought over ſeveral times, to reduce it to the needful fineneſs, and the flax will never thrive ſo well as if it be ſown on land laid as level as the border in a garden. Let the ground have the laſt working about the third week in March, and then let the ſeed be ſown. There are two ways of doing it, that by the drill and by hand: on the former we ſhall be more particular, becauſe we have experience upon a trial, which perhaps no others have made in this kind.

CHAP. XXV.

Of the ſowing of flax.

FLAX may be raiſed in very good crops by the common method, but experience ſhews it may be done much better the other way. The great damage to flax is by weeds; and theſe can no way be deſtroyed ſo perfectly as by the horſehoeing method. The reaſon weeds do ſo much damage is, that in the firſt ſhoot it is for ſome time very weak. In the common methods weeds riſe with it, and being ſtrong they get the better of it. This the perſons who raiſe flax well know, but they do not know how to prevent it: they have tried many methods; but ſome of them have been fruitleſs, others prejudicial. It is for this reaſon we recommend the horſehoeing huſbandry for flax, the ſucceſs of which we have proved by trial.

As ſome may be bigotted to the old way, we ſhall lay down the needful directions for doing it in the beſt manner, according to that practice; and afterwards proceed to the other. If the farmer chuſes to raiſe flax according to the old method, he muſt lay his ground even, with all the clods broke; then he muſt ſee his ſeed ſown by hand, in the moſt careful manner, by ſingle caſt. This done he is to go over the land lightly, with a couple of fine harrows joined together. The time of ſowing flax is the laſt week in March, but if the weather be cold it may be deferred till April. The flax will ripen for uſe if ſown in the middle of April, but unleſs it be got into the ground early, the ſeed does not ripen. Weeds will grow up among the young crop; and the wetter the ſpring the more of them. We have ſhewn the damage, but what is the farmer to do, he cannot get in to hoe them up.

One practice there is in this way, which is the turning in of the ſheep, but though it may be of ſervice, it is capable alſo of doing great harm; ſo that it muſt be done with caution. When the rains of the ſpring have filled the flax with weeds, ſome have ventured to ſend in weeders, but their feet do more hurt than their hands can do good. The method of turning in ſheep is better, but the time muſt be hit very nicely; if the flax be too low they will tread it down and deſtroy it; and if it be grown to ſome height, and the ſtalk firm, they will break it with laying upon it. There is a length of the flax at which it will not be in danger of being trampled in by the ſheep; and at which it will riſe again after their lying upon it. This is when 'tis about five inches high; and if ſheep are turned in then, they will eat up the graſs and weeds; and the flax, receiving little or no damage, will ſtand well the reſt of its time.

This is the method of managing flax according to the common methods of huſbandry, but it is hazardous and imperfect: the ſeed is ſown at random, and there is great danger that in deſtroying the weeds the crop itſelf is ſpoiled. The ſame advantages are procured in a cheaper, and more certain manner by the new huſbandry; and the method of raiſing it is this. The land is to be prepared as in the other method; and the ſeed is to be ſown in treble rows by the drill, leaving the partitions ſeven inches broad between row and row, and the interval between every three and three as ſmall as will admit the horſehoe or hoe plow. In ſowing by hand, three buſhels of ſeed are allowed to an acre, when it is the freſh eaſtern ſeed, and all very fine and full, half a buſhel leſs will do; in the drill way one buſhel is enough for an acre, and the ſtalks riſe more numerous, and grow tenderer and finer.

When the ſeed is in the ground let the huſbandman prepare for hoeing. He is not ſo much to mind the ſhooting of the flax, as the riſing of the weeds; and this is a ſeaſon when they will be very ſpeedy and very numerous. The crop ſhould have all the nouriſhment the land affords: therefore theſe are to be deſtroyed in riſing. Let the intervals be turned up with the hoe plow upon the firſt appearance of weeds; and this will anſwer ſeveral excellent purpoſes: it will deſtroy them; and at the ſame time prepare the earth to admit the roots of the flax freely, and they will be well ſettled in it in the midſt of their proper nouriſhment, before any ſecond crop of weeds can riſe. When the flax has a little height, let hoers be ſent in with hand hoes to clear the partitions. Thus the growth will have all the nouriſhment the earth can afford for its firſt ſhoot, which will be vaſtly ſtronger than it is to be obtained any other way. By theſe means the flax will get ſuch a footing in the ground, before any other crop of weeds can riſe, that it will be too ſtrong for them. It would do without any more hoeing; however, there is no harm in repeating it by the hand hoe, in the ſmall ſpaces; and as to the intervals the huſbandman is to keep a watchful eye upon them, and to repeat the horſehoeing as often as he ſees any parcel riſe, that would exhauſt the ground. No growth requires this aſſiſtance ſo much as flax, and the encreaſe in growth will very well pay the trouble and expence.

CHAP. XXVI.

Of the pulling of flax.

THERE is a peculiar period at which flax is fit to be gathered: this muſt be watched, and the opportunity ſeized as ſoon as it offers. The uſe of flax is of a particular kind. Other crops are raiſed for their ſeed or their roots, but this for the ſtalk; and this will yield to the operations in dreſſing better or worſe, according to the time at which it is pulled. In other kinds the ripeneſs of the ſeed, or the bigneſs of the root, are the marks for their being fit for gathering, but in this it is the due condition of the ſtalk. Thoſe marks are viſible and obvious; this is the more difficult to be known, and therefore it muſt be watched the more narrowly. Although the greateſt part of his flax is to be pulled for the ſtalk, it is proper to let ſome ſtand for ſeed. This makes a different period of gathering: for if the whole were to ſtand till the ſeed was ripe, it would be of little worth. Let him firſt ſet off a part for ſtanding for ſeed, and let this be upon the edge of his ground that is beſt defended from winds, and where there is moſt ſun. If there be a part open to the ſouth, and backed by a good hedge, this is the place. Let him mark out by ſtakes what quantity he will leave there for ſeed, and then watch the reſt for ripening. This particular part is to ſtand till the ſeed veſſel is dry and ready to open, and the ſeeds are full and firm. This degree of ripeneſs is eaſy enough known, ſo there needs no great care on that head; but before this he muſt look narrowly into the other.

It is a common practice to ſpoil the whole crop for the ſake of the ſeed. The owners acknowledge, that if pulled while the ſeed is young, the flax will be the better, but the ſeed good for nothing; they therefore let it ſtand till the ſeed has juſt begun to ripen, and then pulling it the ſeed they ſay will harden and perfect itſelf in the drying. Thoſe who follow this beaten path muſt ſee their flax out of flower, before they examine it for gathering: they muſt then watch when the heads turn brown, and begin to bend down the tops of the twigs whereon they ſtand, for that is juſt the time of pulling this way: but as the flax is ſure to be much the worſe for ſo long ſtanding upon the ground, it is better to ſet aſide a part only for the ſeeds, and pull the reſt when it is in its perfection. We would lead the Engliſh raiſers of flax, into this beneficial way. Our flax is inferior in its quality to that of many parts of Europe, where they have no natural advantages over us for its growth, but only underſtanding its management better: and the great article is their pulling it before it is too ripe.

In the eaſt they ſow particular ſpots with flax for the ſeed, chuſing warm ſituations and the richeſt ſoils. This is one reaſon why their ſeed is ſo fine, their taking ſuch perfect care in the productions of the ſeed plants, and nurſing them up purpoſely and only for it. We confound the two purpoſes of ſowing together, we will have our flax ripen its ſeed, and yet be fine in the ſtalk, which is impoſſible. In the Levant, and in thoſe parts of the Low Countries, and every where elſe in Europe, England excepted, when they ſow flax, they have their large fields raiſed for the ſtalk, and particular ſpots for ſeed. They can therefore pull one crop for uſe juſt when it is fit, and their manufacture from it exceeds ours both in ſtrength and colour. Let us take the example, there cannot be any error in following the ſteps of thoſe whom we ſee excel us in the ſame article. We have not directed their method of raiſing ſeparate parcels for ſeed on diſtinct ſpots, it is ſufficient that our huſbandman ſet apart a certain parcel of his common growth for that purpoſe. When the two conſiderations are ſeparated, they will be both better underſtood. The huſbandman is to let his ſeed quarter ſtand its time, but he muſt have an eye upon the other as it riſes to flower. In the common method the flax flowers irregularly. Some of the ſeed having been buried deeper, and ſome ſhallower: alſo ſome of the ſeed lying ſingle and at a diſtance, and there being heaps in other places, that alſo will make its ſhare in the variation; for ſuch plants as ſtand ſingle will flower a week before thoſe which are in cluſters. From theſe cauſes a field of flax ſown by hand, flowers irregularly, and this is a vaſt diſadvantage in a crop which ſhould be pulled at one exact time, and that determined only by the flowering.

This ſhews why the drill huſbandry is better than the common for raiſing of flax: in that method all the ſeeds being let in at the ſame depth, and diſpoſed with regularity, both the occaſions of the difference in coming to flower are prevented. When the flax is raiſed ſingly for the manufacture, it is to be pulled as ſoon as it is in full flower, the proper time is before one flower falls. Let the owner watch its bud: when that burſts let him have his pullers ready, and as ſoon as all the plants are in flower, and there appears the firſt mark of fading in any of them, let the people be ſent into the field. The more there are of them the better, for the benefit would be to pull it all in one day if poſſible.

The flax is an annual plant; the purpoſe of nature is its ripening its ſeed; and when this is done it periſhes entirely. The uſe we make of the ſtalk is accidental, in reſpect of the plant's growth; and we are to ſeize the period accordingly. The article of value in the flax are the good colour, and the firmneſs of the threads in the ſtalk. Theſe threads arrive at their perfection when the plant flowers. They have been gradually coming up to it before, and from that time they are gradually declining from it. That is the period of perfection, and at that they muſt be taken; in all things when perfection is attained, the next ſtep is toward decay. While the flax is growing to its height, the threads in the ſtalk are green and tender; when it has arrived at its full ſtature they are white and firm, and as ſoon as that period is elapſed they grow brown and harſh. This period is ſhort, and all depends upon it. Nature is not remiſs in marking it, if we be not negligent in taking her inſtructions. The time of flowering is the exact period. Flax always flowers when it has arrived at its full ſtature; it never flowers regularly before, nor except by ſome accident de-

ters

fers it longer. Till it is in flower the fibres in the ſtalk are green and weak; when it is in bloom they are white and ſtrong; and when it loſes the flower and is ripening the ſeed, they become harſh and brown. Whiteneſs and ſtrength are the qualities we require in theſe fibres, therefore the period of flowering is the exact time whereat the plant ſhould be gathered.

We ſee in all herbs that the ſtalks are weak and tender till they flower: they are firm and in their perfection when the plants flower, and they dry up and grow brittle when the ſeed ripens. Flax follows the courſe of other annual plants, and muſt be therefore pulled when the flower is juſt opened, in order to have it in the full degree of ſtrength, colour, and perfection. When the pullers are ſent in, they are to be as expeditious as poſſible in their work. The flax roots very lightly, ſo that the leaſt touch takes it up, and this is the reaſon of the gathering it by hand in that manner. As they pull it up they muſt gather it into handfuls, and tying theſe together they muſt be ſet up in the field at diſtances one from another. In this condition they are to ſtand till they are thoroughly dry: the ſun and air ſoon do this perfectly, and they grow firm but not harſh in the drying. As ſoon as perfectly dry the handfuls are to be houſed, and they are then ready for ſale.

CHAP. XXVII.

Of the working of flax.

WHEN the flax has been well dried after the pulling, the next operation is called rating of it; as to the houſing the bundles, that is a matter merely of convenience. If every thing be prepared, and the huſbandman manufacture it himſelf, he may take it directly from the field to the water; if otherwiſe it is houſed, to keep it out of the way of harm. Rateing of flax is ſteeping it in water, in order to looſen its bark or rind. The thready part of the ſtalk is to be uſed, and the firſt thing is to ſeparate the rind from it, that not being thready. The beſt manner of doing this is by ſoaking it in water: it is done thus. They lay the bundles in a ſhallow pond, dug for that purpoſe, putting ſome ſlight weight upon them to keep them under: and every other day they are to be turned.

When they have lain ſix days they are to be taken out, if the bark be ſufficiently looſened. This is eaſily known by rubbing one of the ſtalks from the middle of the bunch between the fingers: if the rind part eaſily they have been rated enough, if not they muſt lie a day or two longer; but uſually, at that ſeaſon of the year, ſix days are ſufficient, ſometimes it is done in five. When taken out of the water the bundles are to be ſpread abroad and dried; and they will thus be prepared for the brakeing. This is the ſecond operation they go through, in order to being prepared for linnen. This is performed by a particular inſtrument made for that purpoſe, and called a brake. It is notched at the end or throughout, according to the various methods in different places, and with this the thready part is ſeparated from the bark and looſened. The method is to begin at the root, and go all the way up to the top. When the flax has been thoroughly broke by this inſtrument, it hangs in threads and ſcattered pieces, and is then ready for the third operation, which is the ſwingling. This is a kind of beating, and is to be performed with an edg'd ſtick, called for that reaſon a ſwingle. This ſeparates the fibres more, and it always lays them more regularly, and by this the flax is prepared for the fourth operation, which is the beating. The ſwingled flax is laid on a block, and laboured with a beetle, or it is put into a trough, and beat with a hammer, and this beating is continued till the whole ſubſtance of it is made ſoft and pliable. When the flax has been ſufficiently beat it is fit to be hackled or combed. This is done ſomewhat in the manner of combing of wool, what are uſed for flax being called hackles. It is to be worked thoroughly through theſe, one after another, till all the ſhort ſtuff is got out; and the long and fine fibres are made ſmooth, and lie evenly together in form of ſo many threads; in this condition it is fit to be ſpun.

This is the whole proceſs in forming the ſtalk of the flax, gathered at a proper degree of maturity, into thread, and thence into linen; the whole is very familiar, and can admit of no miſunderſtanding. When any large work of this kind is carried on, there need be no grudging of the expence of implements; and where leſs, there are various ways of contriving to ſave money. In ſome parts of England all the trouble and charge of beating flax by hand is ſaved, by a particular ſtructure of their corn mills: they make the axle-tree of the principal wheel longer than uſual, and they place pins in it, which by the motion of the mill raiſe large hammers: theſe beat the flax in the manner of the hammers uſed in fulling mills. Many other contrivances in this way might eaſily be made, but the firſt point is to get people into a way of ſetting about the culture of the herb. Thoſe who raiſe the flax for ſtalk and ſeed both, have a neceſſary operation which we have not yet named. That no information may be wanting for thoſe who raiſe flax in their own way, we ſhall add the method of ſeparating the ſeed before the ſtalks are put to be watered. This is called ripling, and it is thus done. The flax being pulled when the ſeed begins to be brown; when the bundles have ſtood up ſeven or eight days, and are pretty well dried, they are to paſs thro' the ripple; this is a kind of combing of the ſtalk. The ripples are made of wood, and have their teeth ſo cloſe, that when drawn over the ſtalk they ſtick at the heads or ſeed veſſels, and pull them off. The bundles are then to be put into the water, and theſe ſeeds not being yet altogether dry, are to be laid by in an airy room till ſpring, when the whole is to be thraſhed in the common way, to ſeparate the ſeed from the huſks.

This operation, in ſome degree, prepares the ſtalks for rating: but it is not neceſſary. According to our advice no regard is to be had to the ſeed of the flax which is raiſed for manufacturing; and therefore the whole bundles, when they are moderately dried, are to be put into the water, where the leaves will fall off about the third day, and ſometimes the ſtalks will be ready for their firſt dreſſing the day but one afterwards. The time of taking them from the water is one of the critical points in managing of flax, it muſt therefore be watched accordingly. When the bark will part, and the threads ſeparate, it is fit for taking out, and that time ſhould not be let ſlip. If this happen the third day there is no occaſion for any more rating, and if it be not in this condition on the ſeventh, it muſt lie yet longer. The condition of the flax is to guide the workman, not any particular number of days.

CHAP. XXVIII.

Of hemp.

AFTER flax we are naturally led to hemp, theſe two ſpecies being raiſed for the ſame purpoſes of cloth, though flax be the finer. The culture of the plants agrees in many reſpects, though in their form and nature, excepting that ſingle article the threadineſs of the ſtalk, they differ extreamly. Hemp is a large, tall, buſhy plant, of a rough aſpect and irregular growth, but upright and firm. In flax, as in moſt plants, the male duſt and the female embrio are lodged in the ſame flower; but in hops the male duſt grows in a kind of little flowers on ſome plants, and the female embrio on others. This is the caſe alſo with hemp, and from hence has ariſen a diſtinction in this kind into ſexes. The huſbandman obſerving that from the ſame quantity of ſeed there roſe two kinds of plant, though alike in leaves and ſtalk, the one bearing little duſty flowers and no ſeeds, and the other producing ſeeds without any obvious flowers, called theſe two kinds by the names of male and female hemp. But they called thoſe plants which produced ſeeds the male, and the others the female. This was ſo contrary to nature, that the names have been changed; and are now given to thoſe plants to which they properly belong, that with only flowers of this duſty kind being called male hemp, and that which has ſeeds female.

Hemp is an annual plant. The root is long, ſlender, divided into branches, and full of fibres. The ſtalk is thick, upright, ridged, of a green colour, and grows ſix or ſeven foot high. The leaves are numerous, and divided in the manner of fingers; or five ſeparate leaves grow upon each foot-ſtalk; they are of a dead green colour, rough to the touch, and notched at the edges. In this male and female agree; the only difference between them is, that the male is the lighter and more delicate plant. The ſtalk is ſmall, and it has fewer branches; and it is tenderer and more hollow. On the tops of this kind grow the duſty flowers, which are of a whitiſh yellow with a tinge of green. The other or female hemp is more robuſt, the ſtalk is thicker and more branched, and inſtead of theſe duſty flowers it bears the ſeed. The male hemp is by ſome diſtinguiſhed by the name of ſummer hemp, and the female by that of winter hemp. The male comes to its ripeneſs a month ſooner than the other, and yields the fineſt thread. The ſtructure of the ſeveral flowers and fruit are curious, and worthy obſervation. In the male the flower is compoſed of five little leaves, pointed at the ends, and growing together at the bottom; within theſe ſtand five ſmall threads, with each an oblong ſquare button at its top. In the female there is a green huſk of an oblong ſhape, which ſplits open on one ſide, and at firſt contains the rudiments of the ſeed, and afterwards the ſeed itſelf, for it does not fall off as theſe parts uſually do. The rudiment is very ſmall, and has two long points riſing from it, ſharp at the ends; the ſeed follows, and continues ſhut up cloſely in the huſk.

Hemp was known to the antient Greeks and Romans. It is a native of the warmer climates: but where it grows wild in abundance, they cultivate it not the leſs in fields for uſe; for the ſtalk never has its perfection in the wild ſtate. There is properly but one kind of hemp. We have mentioned already the difference of male and female, but they both ariſe from the ſame ſeed. There is an account in authors of a plant called Virginian hemp, which is large, and has leaves unlike ours, ſingle, not fingered, neither does it produce its ſeed like it, tho' the courſe of nature in it has ſome reſemblance. This grows in the ſalt meadows, and is called by ſome Acidna. There are alſo ſeveral kinds of a wild Engliſh plant called baſtard hemp; but this is properly a ſort of dead nettle.

CHAP. XXIX.

Of the proper land for hemp.

THE culture of hemp is one of thoſe neglected articles within the province of the huſbandman, by which he who will engage judiciouſly in it, will not fail to make very conſiderable advantage. We ſhall lay before him full directions for the management of his crop, and ſhall be happy if by ſpiriting up the induſtrious, we can promote a thing that will be not only uſeful to themſelves, but to their country. The importation of hemp in various forms, is a reproach upon the Engliſh huſbandry, for we are able to raiſe it as well as any of thoſe from whom we receive it. In undertaking this article of huſbandry, the firſt thing to be conſidered is the ſoil. For there is no growth whatſoever that ſo perfectly depends upon the nature of the land for ſucceſs.

Hemp requires a deep, rich, light, and dry ſoil. In England we have more and finer loams than in any country whatever, and theſe are the kinds of land that beſt anſwer the purpoſe. One of our dark duſky loams in which there is a good deal of ſand, and a large quantity of pure mould, will anſwer beyond any other ſoil; we have a great deal of this in Northamptonſhire, Lincolnſhire, and Buckinghamſhire, and I have obſerved that it there runs very deep, often two foot and a half or three foot, with a good open loam at the bottom. This is the beſt of all grounds for raiſing hemp. It is a ſoil that will bear any crop; but the farmer will not find any that will bring him a greater advantage. There are ſoils particularly improper, as well as ſuch as are fitted for this growth. The moſt unfit are cold clays: on theſe hemp can never thrive; it is a native of the eaſt, where the ſoils are light and dry, it is therefore againſt nature to force it here, to live in a cold, tough, and wet land. The other ſoil, on which it ſucceeds poorly, is that on which it is too often ſown; this is the deep black mould that lies in low paſtures, and is always wet. The depth and richneſs of this would agree very well with hemp, but it is always too moiſt. A deep earth for the roots to paſs every way, is one of the requiſites for hemp; but warmth is the other: and this latter is ſo eſſential, that it will grow better in a poor land that is warm, provided it be deep, than in a very rich one that is too cold. For this reaſon ſand is ſo eſſential an article in the ſoil for hemp. I never ſaw this plant thrive any where,

where there was not ſand in ſome conſiderable quantity in the ground. I am aware of an objection that will be made to this aſſertion, by thoſe who have ſeen hemp cultivated in the lower parts of Northamptonſhire; but I have ſeen it there, and have anſwered ſo natural, yet groundleſs, an objection on the ſpot. The land on which they raiſe hemp in this part of England, is a deep black mould, which has been of the moory kind; but by the perfect draining of the adjacent fens is now left dry and crumbly.

Hemp would not have grown here to any profit, while the land was wet, but it ſucceeds very well in its preſent ſtate. I have often talked with the farmers who raiſe it here, and they have told me there was no ſand in the ground; to convince them I have only waited for a ſhower of rain, after which the firſt eye that is caſt upon the land ſhews it in abundance. The truth is, this is the richeſt loam in the world, there is a little clayey matter which holds it very well together, and ſerves to detain wet enough to keep it always moiſt, and yet not ſo much as to chill it: and there is a conſiderable quantity of middling brown ſand: this warms and opens it excellently, but the body of the ſoil being a fine black mould, that covers both the clayey particles and the grains of ſand, till waſhed off by rains. This is a particular ſoil, but it is not ſingular in that place: I have ſeen it in Lincolnſhire, Warwickſhire, and Leiceſterſhire: wherever it is the farmer may be aſſured, if he will ſow hemp upon it, he will have a very great return. I have ſeen the experiment of ſowing hemp on gravelly and ſtony lands: the ſucceſs has depended upon the condition of the ſoil in depth, and the degree of ſtonyneſs; if it be a deep loamy earth, with a moderate quantity of gravel or limeſtone fragments on the ſurface, nothing does better; but if it be gravelly to the bottom, or the ſtones be too large, it will not ſucceed.

CHAP. XXX.

Of preparing land for hemp.

A Field may be put in order for hemp, either by breaking up freſh, or manuring after other crops; but the former is the better way. In Northamptonſhire they break up paſture ground, when they have opportunities: and in ſome of the counties where they have got into the method of raiſing the artificial graſſes, they plow an old lay of one of them, and it always anſwers very well. Once I ſaw a piece of woodland firſt ſown with hemp, after the ſtubbing up the roots, and moderately ſpeaking, the crop was twice as large as I ever ſaw it on any other ground: the ſoil was very proper, deep, and loamy, and it had lain in wood many years. Whatever ground be choſen it will require to be very well dreſſed; not that dung is ſo proper, for hemp does not ſucceed well upon it; but a right degree of tillage.

This recommends the horſehoeing huſbandry, before all others, becauſe that gives the neceſſary tillage, and omits either altogether or in great part the uſe of dung. When manure is uſed to a field deſigned for hemp, it will be better to chuſe ſome other kind, and not dung; and to improve the ſoil by the laſting, rather than by theſe temporary additions. Land which has been bearing other crops is not ſo proper for hemp, as freſh. Hemp requires a great deal of nouriſhment; and theſe fields are exhauſted by what they have borne. There is no way in the common practice to recruit them but by dung, and that hemp diſlikes: Therefore freſh lands are better: but though the beſt they are not the only ones that will do. I write in theſe things from experience and obſervation: I have told the farmer what I have ſeen, I ſhall add what I have tried. I have made a piece of ground that has borne its third crop in the uſual way, yield a very good produce of hemp by good tillage, without any addition of manure. Therefore it is ſpeaking from experience as well as reaſon, to recommend the horſehoeing huſbandry for this plant. Let the farmer take care that his ſoil be proper, and he may raiſe it at any time, or in any condition, only by a ſufficient tillage.

This aſſertion is founded on fact, and it is the greateſt proof I know of the truth of thoſe principles on which the practice of horſehoeing has been eſtabliſhed. Hemp requires a great deal of nouriſhment, yet it will thrive very well upon land ſo exhauſted by its third crop, that it would have yielded nothing to any profit without a refreſhment of manure; there being no manure at all added for the hemp, but the whole being done by tillage. This is a proof that tillage alone prepares the earth to yield nouriſhment to plants, for the hemp thriving ſhews that it has nouriſhment in abundance. And there has been nothing but the tillage to give it. If the land on which the farmer intends to raiſe hemp be new broke up, whether from wood or from natural or artificial graſſes, all that he has to do is to render it ſufficiently fine, and expoſe it a little to the ſun and air; and then going over it once again to level it, and get in his ſeed: but if it be a field that has borne other crops, and is exhauſted, he is to refreſh it, by ſubſtantial manures according to its kind, as mud, ſand, or the like; and then to break and divide it by repeated tillage. In this caſe, the oftener he goes over the ground the better, and the more variety of inſtruments he uſes the richer he will make it. Let him turn it up deep with a proper plow, and tear it to pieces afterwards with a harrow. Then, in a dry ſeaſon, let him draw a heavy roller over it, to cruſh the clods; and when he has done this harrow it again, to break thoroughly to pieces what the roller only bruiſed. After this, let him give it reſt for ſome time, that the ſun and air may penetrate it well, and then begin by plowing again. Let this practice be obſerved throughout the winter, and in ſpring let him lay it level and even for his ſeed.

CHAP. XXXI.

Of the ſowing of hemp.

WE will ſuppoſe the winter dreſſings to be paſt, and come to ſpring, that is the ſeaſon for ſowing this valuable crop. Let the farmer take care that he get good ſeed. If he err in this reſpect, all his labour will be fruitleſs. Let him chuſe ſuch as is freſh, firm, and bright; and try it by rubbing it well between his hands. If it bear this without breaking, and look the finer and cleaner for it 'tis good, but if it appear duſty and broken it is old and damaged. Good ſeed being choſen, the quantity is to be determined, according to the method propoſed for raiſing it. If by the common huſbandry three buſhels are to be allowed to every acre: if the drill and horſehoeing be followed, which is much beſt, a buſhel and half of ſeed to an acre is ſufficient.

The ſeed being ready and the ground dreſſed, the laſt operation muſt be preparing it for the ſeed; and this muſt be very carefully done. The firſt week in April is the right time for ſowing hemp, therefore let him begin his laſt dreſſing accordingly. If the ſeaſon be unfavourable, the ſowing may be deferred a week, ten days, or even a fortnight without damage, but 'tis beſt when it can be done at the time juſt named.

When the farmer gives the land the laſt dreſſing, he muſt make it fine and level as the border of a garden; hemp-ſeed is tender, it will not grow unleſs laid in very regularly. It requires but a ſlight covering, and if it be buried deeper, it will never come up. If any clods be left in the ground they will fall over ſome of the ſeeds, and ſuch will periſh. I have ſeen the bad effects of careleſſneſs in this article, and therefore caution the farmer the more ſtrictly; in the common way of ſowing not a third of his plants would come up; and one half of thoſe will riſe irregularly, and getting bad habits by twiſting in their firſt ſhooting, will never come to any thing conſiderable afterwards. When the land is of a ſufficient fineneſs let a careful ſeedſman go over it with the ſeed, and ſpread it regularly over the ground, by ſingle caſt, as evenly and equally as he can. As ſoon as this is done let the field be harrowed very lightly, and well defended from birds. There is no ſeed of which ſmall birds are ſo fond as hemp: it is large and conſpicuous, ſo that it attracts their eye, and it is to be ſlightly covered, ſo that they can eaſily get at it. Boys muſt be ſet to watch, and all imaginable care taken of it for ſeveral days after ſowing, otherwiſe the farmer, with all his former cautions, will have but a poor account.

This is the method of ſowing hemp in the common way of huſbandry; and to what has been laid down already we have only one caution to add, which is, that the farmer who expects a good crop do not follow the practice of thoſe who do nothing to their land till they are juſt going to ſow. There are thoſe who content themſelves with giving it one plowing in ſpring for hemp: but by what I have ſeen they content themſelves alſo with a poor harveſt. Hemp in its nature requires a land better dreſſed than almoſt any other ſeed.

We are now to name the way of raiſing hemp in the horſehoeing method, which we have before obſerved is vaſtly preferable to the other. The preparation of the ground muſt be the ſame as in the other method, and the ſeed muſt be planted in double rows, with ten inch partitions, and with intervals juſt broad enough for the paſſage of the hoe plow. The ſeed muſt be planted very ſhallow. Hemp is a large plant, therefore it muſt not be ſet in treble rows, for the middle one wanting air would come to nothing. It ſucceeds very well in a ſingle row; but experience ſhews, that in the double, with this interval, the plants grow as well, and the profit is much larger. This is the method of cultivating hemp to the greateſt benefit.

CHAP. XXXII.

Of the ordering hemp in its growth.

THE horſehoeing huſbandry ſupplies plants with freſh quantities of nouriſhment during their growth. This is not more neceſſary for any thing than hemp, for the filling of the ſtalk depends upon it. 'Tis for this reaſon that we have ſo particularly recommended the new huſbandry for this ſpecies. A plant raiſed this way will be often worth four in the common method. In that practice the hemp is left to itſelf, as ſoon as it is well out of the ground. The attendance is only required till the body of the ſeed is waſted. Birds will not meddle with it afterwards, and as to weeds they cannot live among it. 'Tis a quick grower, and a very ſtrong plant; and in the way of ſowing by the common method, the ſhoots will riſe ſo near one another, that they will have enough to do to live well themſelves, 'till they begin to pierce with their roots to ſome depth; and neither then nor afterwards, will they ſuffer any thing elſe to live among them. Hemp is ſo far from being in danger from weeds, that it is the beſt thing that can be ſown for preventing them for the future. Nothing clears a land ſo thoroughly as a crop of hemp; but then it exhauſts the ground ſo thoroughly, that it leaves it fit for little elſe without a great deal of preparation.

The two great advantages of horſehoeing huſbandry, are deſtroying weeds and furniſhing nouriſhment while the crop is growing. For the firſt purpoſe hemp does not need its aſſiſtance; but nothing requires it more for the latter. If hemp ſatisfies the farmer in the common way; it will enrich him in this; for every plant will ſpeak for itſelf in the praiſe of this method. When the ſeed is let in by the drill, the danger is not ſo great from birds and other vermin, becauſe it is all covered; but this is not a ſufficient ſecurity, one ſeed that ſhall chance to lie naked will tempt theſe devourers: therefore it is to be watched. The time of the birds feeding upon the ſeeds is principally before ſunriſe, therefore the ground muſt be carefully watched from break of day: after this they are leſs ravenous, till towards evening, when they feed again, till within half an hour of ſunſet.

When hemp has four or five inches height in the ſhoot, the weeds will begin to fill the intervals; and ſome, though not many, will riſe in the partitions. Let the farmer ſend in careful labourers with hand hoes, to cut down thoſe in the partitions. Once doing this will be ſufficient, for the hemp gathering ſtrength will not permit them to get up any more. The hoers ſhould alſo pull up here and there a plant of the hemp, where they have riſen too thick: but this is an article in which they muſt be ſparing, for the working of the intervals between will render the ground capable of ſupporting the two rows of hemp, with the plants cloſer than can be well imagined. When the weeds are cut down by hand in the partitions, let the horſe hoe be brought into the intervals, and with this let all the ground between the pairs of rows be turned up deep, and broke fine. The weeds will be deſtroyed by this, and the whole ſoil made fit to receive the roots, and filled with nouriſhment to ſupport them. The effect of the horſehoeing is in no caſe ſeen more perfectly or plainly. The fibres of the roots of hemp, even in the moſt favourable ſoil, do not naturally ſpread, but lie in cluſters about the baſe of the ſtalk, their number anſwering for their ſhortneſs. But in this way of horſehoeing the fibres of the two oppoſite rows will meet acroſs a five foot interval viſibly, and fill all the ſpace between ; this is plain to the eye in examining the roots, and the flouriſhing ſtate of the plant confirms it. The horſehoeing muſt be repeated as often as the weeds appear in theſe large intervals ; for no more, after the firſt, will riſe in the partitions. The ground will thus be every now and then cleared and enriched, till the time of pulling the crop.

CHAP. XXXIII.

Of the pulling of hemp.

LAMMAS is the ſeaſon of the firſt hemp harveſt. There are two gatherings of this plant in every ground : the male and female, which riſe together from the ſeed, differing in the time of ripening. This makes a particular article in the management of hemp. We have mentioned the ſeaſon of the male hemp, which is called alſo the ſummer hemp, and by ſome fimble hemp, ripening. At this time let him keep his eye upon the field, and obſerve when he ſees the leaves beginning to hang and turn yellow. He will perceive this when once it has begun, ſpread quickly through the field, but only upon the male plants. About the time of the leaves drooping and growing yellow, the ſtalks turn whitiſh: and this is the ſignal for gathering : no farther care is needful. This kind bears no ſeed, ſo that there is no ſecond conſideration as there is in the other. When the male hemp has got into this condition, the pullers are to be ſent into the field. Hemp is gathered like flax, by tearing up by the roots. But here there is a great difficulty. The flax is eaſily enough pulled up, becauſe it is all to be pulled : but in the hemp it is only a part : and it is not eaſy to do this without damaging the remainder. When hemp has been ſown in the common method, all the owner can do is to caution his pullers not to trample down, break, or otherwiſe injure the female hemp that is left ſtanding ; but with his beſt inſtructions, there never fails to be a great deal of miſchief. In this reſpect, the raiſing hemp by the drill and horſehoeing huſbandry, in the method of double rows, has a vaſt advantage. The intervals between two and two rows are ſo wide, that the pullers can eaſily and freely get in between them ; they can take up the male hemp without the leaſt damage to the female, and they have room to manage it and get it up into bundles.

The firſt pulling being over, the remainder of the growth is to ſtand till Michaelmas. It thrives the better and the faſter, becauſe of being thus thinned ; and the time of gathering it coming in late, after the other harveſt work is over, is happy for an induſtrious poor, in the places where it is propagated.

The gathering of the male and female hemp is to be done in the ſame manner, except that there is to be a difference in making up the bundles. Each kind is to be bundled up as flax, but the male hemp is to be gathered into ſmall, and the other into large ones. The male hemp ſhould be gathered up into ſuch bundles as may be graſped with both hands, but the female hemp is uſually got up into ſuch as are a yard round.

CHAP. XXXIV.

Of the drying of hemp.

IN hemp of the firſt gathering nothing is to be minded but the drying it in a proper manner, to fit it for farther working; but in the female regard is to be had to the ſeed. The time of making the ſecond gathering is determined by the ripening of the ſeed: and when gathered and bundled, theſe bundles are to be ſet up in the ſun four or five days, and then ſtacked: that at a proper time the ſeed may be thraſhed out before they are fitted for farther manufacture. It is the common practice to raiſe this hemp in ſtacks, in ſome ſheltered part of the field; but as the beginning of October is uſually a dripping ſeaſon it is better to houſe it. A little wet does it no harm as to the main article of the ſtalk, but it may eaſily get damage in reſpect of the ſeed. The caution we have given, that the hemp which is to remain be not hurt in the firſt gathering, will be eaſily ſeen to be worth his ſerious conſideration, when he comes to thraſhing his female hemp. From the produce of an acre of good land he will get three quarters of ſeed, if he have followed the common husbandry in raiſing it; but if he have done it in the horſehoeing manner he will have four or five quarters, ſometimes more. This ſets the female hemp a great deal above the male in value, and the ſtalk is much more valuable in the female.

CHAP. XXXV.

Of the watering of hemp.

WHEN the male hemp is gathered nothing is to be done but drying it, before it is carried to the water. The common practice is to bundle it up as it is pulled, and ſet the bundles up an end till the moiſture is ſomewhat evaporated. This is all that can be conveniently done in the common way of huſbandry, becauſe there is no ground for ſpreading it; but in the horſehoeing method, as there is ſpace between two and two of the rows, it is beſt to throw it upon the ground as it is pulled, and let it lie a day and night; and after that to gather it up into bundles. The male hemp, as ſoon as it is a little dried from the gathering, and the female, after the thraſhing, are to be carried to the water in their proper ſized bundles. A large ſhallow pond is beſt: and it ſhould have a firm bottom: running water would anſwer better: but it is not permitted any where to uſe it, for the hemp infects it, deſtroys the fiſh, and ſpoils every thing that is done with it.

Let the farmer therefore who is raiſing hemp take care to have a pond of proper depth and dimenſions ready, according to the quantity. He is to prepare for the hemp by driving in half a dozen ſtakes in a ſquare form, very firmly into the bottom. Then the hemp is to be laid in, keeping it under water; and the ſmall ends of the bundles are to be placed interchangeably, the thick ends of one bundle being laid one way, and the thick ends of the next another, and ſo with the whole parcel. In this manner the bundles are to be laid in, one upon another, and the water is to cover them all. When they are all in there are to be over-layers, as they call them, of wood bound to the ſtakes, to preſs them down, and keep them not only under the water, but fixed from ſtirring about. Some cover the ſquare within the ſtakes entirely with over-layers of wood; others only cover the edges with theſe, throwing great ſtones or other heavy rubbiſh, to keep all under water. Whichever way the hemp is kept conſtantly under, 'tis all one. When it has lain five days, one of the upper bundles is to be taken out and waſhed in another part of the pond. In this waſhing the farmer is to obſerve whether the leaf comes freely off, for if it does the hemp is watered enough, if not it muſt lie longer. When it is watered enough, the bundles are to be taken out one by one; and waſhed in other parts of the pond, that all the leaves may be got off, and any filth or other matter that may by accident be got among them, may be diſcharged. The clean ſtalks are then to be ſet up an end, that the wet may drain from them. When they are drained, they are to be ſet up againſt a wall or pales, expoſed to the ſouth ſun, that they may thoroughly dry.

CHAP. XXXVI.

Of the brakeing of hemp.

THE hemp when dry is ready for the brake. This is a wooden inſtrument made with an edge, and in all reſpects like that uſed for flax but larger and ſtronger. This is the caſe with all the inſtruments uſed in dreſſing of the hemp. The effect of this dreſſing is, that the bark or rind is ſeperated from the ſtringy part of the ſtalk, and that is broke and prepared for farther manufacturing. The thorough drying of the hemp is neceſſary to the doing this well, for otherwiſe the bark will not ſeparate, nor the threads come to pieces; and the dryneſs of the weather is a great advantage, wherefore this ſhould never be ſet about but in a favourable time. If the ſeaſon have been dripping, and the hemp could not be got thoroughly dry by the method already directed, it muſt be done by the aſſiſtance of fire: but there is great caution neceſſary; for hemp eaſily takes fire in the drying. So many accidents of this kind have happened, in places where hemp dreſſing is carried on, that every one ought to be vaſtly upon his guard who ventures it.

In ſome places they raiſe a kind of frame for this purpoſe. They drive ſtakes into the ground at proper diſtances, and lay hurdles over them at five feet from the ground: they then ſpread the hemp thin upon theſe hurdles, and make a ſmall fire underneath. This requires good watching, but as a little heat does for the hemp it may be conducted without danger. The expence is trifling, and it makes it work much the eaſier. The method of brakeing is the ſame in hemp as in flax, and the purpoſe is the ſame, the preparing it for farther dividing. It muſt be begun at the root end, and broke up to the top; and the perſon who breaks it muſt look into his work at times. The deſign of brakeing it is, that the ſtringy part of the ſtalk may be all thoroughly cruſhed and looſened. When this is done, and it hangs in ſhivers, it is enough; if otherwiſe it is to be broke more. Let not this be ſlighted: the whole management of hemp is very eaſy, but it muſt be conducted with care; for a miſtake in this reſpect can never be mended afterwards, without difficulty, waſte and loſs.

CHAP. XXXVII.

Of the dreſſing of hemp.

THE brakeing being over, the next operation is the ſwingling. As to the brakeing, ſome perform it at once, which is the better way, others go over it twice: this takes up time, and with good management is not needful. When the hemp goes through this operation twice, the brakers are of two kinds, one coarſer the other finer, and it is firſt broke in the one then in the other; but if a brake of a middle degree of fineneſs be carefully uſed, once does it, and it will be fit for the ſwingle without any more trouble. The ſwingle of hemp, which is the firſt dreſſing after the brake, is performed by two inſtruments, a block and a dagger. The block is made of a ſingle deal raiſed four foot above the floor, and ſupported ſtrongly to keep it ſteady; the dagger is a wooden one, of the form of a broad large dagger with a blunt edge. With this the hemp is worked upon the block, opening and beating it till all the knotty pieces and ſhivers are entirely broke, and the whole is ſmooth and even.

The parcel of hemp brought to the brake together, is called a ſtrike: this they alſo bring to the ſwingle together, and when they have ſufficiently wrought it, they ſtrike a fold or twiſt in the middle, which is the thickeſt part, and ſo lay it by, proceeding with the reſt.

This ſwingle is a very uſeful operation, and muſt be done carefully: the more ſo becauſe it prepares the commodity at once for the market, if the owner chuſes to part with it in that condition. There are two things to be done in the ſwingling, the one is the breaking out the lumps and ſhivers, and the other is ſoftening the thready part, which is very well effected by the ſwingling, provided that be done carefully. If the owner chuſe to part with his hemp in this ſtate, he has no more to do but carry it to market; but he may more profitably prepare it farther. The next is a ſecond ſwingling. This is done in the ſame manner as the firſt, and works it finer. The firſt ſwingling beat away the lumps and ſoften the threads; this ſecond divides them finer, lays them ſmoother, and prepares it for heckling. When the ſecond ſwingling is over, the ſtrikes are divided into dozens and half dozens, and made up into great thick rolls. Theſe are ſpitted upon long ſticks, and hung in a chimney, or in the way of ſome other gentle warmth. They muſt be dried in this manner till there does not remain the leaſt damp or moiſture in them; and they are then fit for beating. This is to be done in a deep and ſtrong trough, or upon a block hollowed at the top, and the beetles muſt be large and heavy. By this operation all the threads are rendered fine, clean and tough. When this is done the ſtrikes are to be divided, and all examined, to ſee if the whole be beaten enough; frequently ſome are not, and theſe muſt be beaten again.

When the hemp has been twice ſwingled, carefully dried, and well beaten, it is to be brought to the heckle. This firſt heckle muſt be coarſe, and have very open teeth. From this heckling there will come ſome coarſe parts, which neither the ſwingling ſeperated nor the beating ſubdued; theſe are to be laid aſide, and the hemp that has gone through this firſt coarſe heckle is then to be worked in one that is finer. This prepares it for working into cloth the uſual way: but when it is deſigned for linnen of particular fineneſs, there is ſome difference in the management; and this may be worth the farmer's notice, whether he intend to work it into cloth at home, or deſign it only for ſale in the ſtrike or heckle. Two dryings are convenient on this occaſion, that is, when it has been dried and beat, and once heckled, it is to be rolled up and dried over again, and the beating and heckling repeated in the ſame manner: after this the heckles deſigned for flax are to be uſed inſtead of thoſe for hemp; theſe being coarſer and not ſo fit for the fine work, even in hemp.

CHAP. XXXVIII.

Of managing the hurds.

WE have mentioned the ſeparating the coarſer part of hemp in dreſſing. This coarſe and knotty part is called the hurds, it is not to be waſted; but being laid aſide in the dreſſing of the other, is afterwards to be managed by itſelf. In the firſt ſwingling of the hemp there will be ſeperated from the finer part a great quantity of refuſe, with tops, knobs, and half broken pieces. All theſe muſt be ſhook up together, and carefully dried. When this is done they are to be threſhed with flails, and by this means the lumps will be broken, and they are to be laid by: they ſerve for many coarſe purpoſes, though they would never have broke or divided well with the finer ſtuff. Theſe, by way of diſtinction, are called the ſwingle-tree hurds; though any of the refuſe may be beat up among them: a great care of the owner being, that nothing which can be put to any uſe be waſted. When the farmer dreſſes the hemp farther, there will be more hurds ſeperated in the ſecond ſwingling, and they will be of a better kind; theſe managed by the wool cards, make what is called hempen harden. They are not to be mixed with the other hurds, for they are much better, and ſell at a better price. Every ſucceeding operation for the dreſſing the hemp ſeparates a quantity of hurds, though it be every time ſmaller. Theſe are all to be laid by as they come out. They do not require thraſhing in the manner of the coarſe firſt hurds and refuſe; but being well managed with the cards, they make ſo many ſorts of ſaleable ſtuff at different prices.

CHAP. XXXIX.

Of woad.

WOAD is a plant of eaſy culture; ſubject to few accidents, and of ready ſale. 'Tis pity therefore it ſhould be cultivated in ſo few places. One recommendation it has in which it exceeds any growth, it yields three, four, five, and ſometimes ſix crops in a year. It is a large plant, with great blueiſh green leaves, branched ſtalks, and multitudes of ſmall flowers, followed by little pods with the ſeed. The root is long and cover'd with fibres. The ſtalks are thick, round, and upright, and they divide into ſeveral branches. The leaves ſtand irregularly, and many very large ones riſe directly from the root. The flowers are of the ſhape of thoſe of turnips, and the ſeed is oval. The flower is placed in a little cup, conſiſting of four oval colour'd leaves: it conſiſts in like manner of four leaves diſpoſed croſſwiſe. There riſe in the middle ſix filaments, four of theſe are of the length of the leaves of the flower, and two are ſhorter; they have oblong buttons on them, placed ſideways: in the center of theſe ſtands the rudiment of the fruit. It is oblong, ſharp on both ſides, and is no higher than the two ſhort filaments; the flower and it's cup falling off, this ripens, and contains only one ſeed, which is lodged in the center.

There are ſeveral kinds of this plant brought for curioſity out of different parts of the world, but only one is worth the farmer's notice, this is the common or broad leaved woad, called field woad. There is a kind with ſmaller and narrower leaves, diſtinguiſhed by the name of wild woad. The ſeed of this is ſometimes, by deſign or accident, mixed with that of the right ſort, and of this the farmer ſhould beware; this ſeed is ſomewhat ſmaller than the right.

CHAP. XL.

Of the proper ſoil for woad.

TWO articles in a ſoil favour the growth of woad, that it be dry, and that it be rich. When theſe happen together the ground is perfect for this plant; but ſeperately they will do. Any warm and dry ſoil will anſwer, though it be but poor, and in a rich ſoil woad will do, tho' it be not ſo perfectly dry as it muſt be in the other. What this plant affects moſt is a rich warm loam; and as richneſs and dryneſs are what favour it, cold and wet together will never fail to deſtroy it. Clayey ſoils will never do. This is the great caution. The next is, that be the ſoil what it will, the woad will not ſucceed upon it unleſs very deep, if there be a clayey bottom. This depends upon the ſame principle with the other, the hatred there is in this plant to cold and wet; for clay holds wet, and always makes a ſoil cold when it lies near the ſurface.

From theſe general hints the farmer may ſettle his practice in all the needful particulars. Let him avoid clays and clayey ſoils for woad, and when he is about to ſow it in any other, let him examine the depth and the bottom. Woad is a large plant, and requires a great deal of nouriſhment, therefore it muſt have depth of ſoil: and particularly when there is a wrong ſubſtance underneath. If he have a ſandy ſoil that is not bare and poor, but enriched with a large quantity of good mould among it; this is excellent, and the deeper the better. If he have pure mellow earth to a due depth, this is better ſtill; and in particular if he have opportunity of breaking up a piece of ground near ſome great town, where there has been a garden. It is worth his while to be careful in the choice, becauſe the profits will anſwer. On favourable ground he will have one or perhaps two more crops in a year, than on others.

Woad, like other plants which require a great deal of nouriſhment, ſucceeds beſt upon a piece of ground that is new broke up: and in this caſe none anſwers like that which has been mellowed by dung and great tillage. If there be a piece of gravelly ground where there is not too great abundance of large pebbles, and a good deal of loam among them, this will do excellently. I have ſeen woad thrive very finely, where it has ſeemed to grow among bare ſtones; but there has been good ſtuff at the bottom. A piece of light limeſtone ground will alſo do for woad, with the foregoing reſtrictions, that it be not full of very large pieces of ſtone; and that there be ſome goodneſs and ſome depth in the ſoil.

Of all places in England where I have ſeen woad cultivated, the fineſt has been about Thorney in Northamptonſhire. I had the curioſity to examine the ſoil in ſeveral of their fields, and found it all of one kind, it was deep, rich, and of a blackiſh colour; it conſiſted chiefly of mellow earth, but with a large proportion of a bright brown ſand. What is more remarkable is, that the ſituation was low and ſubject to wet. The woad grows there in the way of more moiſture than I have ever ſeen it elſewhere, and yet ſurpaſſes all other in the largeneſs and fineneſs of the leaf. This is a particular caſe, and I have inſerted it as ſuch, for the ſake of the huſbandman who may chance to have land of the kind of this about Thorney, but in general a ſomewhat hilly ſituation is beſt, and a dry deep ſoil.

We have obſerv'd that woad ſucceeds beſt upon new broke up land: the ranker this is the better the woad will thrive; it ſerves excellently to prepare ſuch land for crops of corn, for which it would otherwiſe be too rich at firſt: but on all other occaſions, as well as this, the woad is to be removed after a year or two. It exhauſts the ground, and never ſucceeds well in the ſame place long together. The new method of huſbandry might remedy that inconvenience, and perhaps with the aſſiſtance of a moderate quantity of manure, the ſame piece of ground might be made to bear woad ever ſo long; but this we ſhall mention more at large hereafter: the common practice of huſbandmen is what we conſider in this place; and that requires that the crop ſhould be removed the third year.

CHAP. XLI.

Of preparing the ground for woad.

WHEN the farmer has fixed upon a piece of ground, his care is to prepare it for the reception of the ſeed. All plants that draw a great deal of nouriſhment, require the ſoil ſhould be well fitted for giving it. The preparation is beſt given it by frequent tillage; and a careful and repeated breaking and dividing, and occaſionally enriching of the ground. The beſt way of preparing ſuch a freſh piece is, by turning it up firſt with the four coultered plow. This will cut and tear all the entangled roots of graſs, and turn up the mould to a very conſiderable depth. After this plowing it ſhould be harrowed carefully, and if the ſeaſon and ſoil be both dry, it ſhould be rolled, and then harrowed again.

This being done, the lumps broke, and refuſe drawn off, there ſhould be people ſent on the ground to pick off the large ſtones, or any thing elſe that breaks in upon the evenneſs and fineneſs of the mould, and has eſcaped the teeth of the harrow. This is the cuſtom in land that is moſt fit for woad, that is, ſuch as is dry and warm: when it is a little moiſter the beſt way is to plow it in high ridges, and then the refuſe that lies upon the ſurface, when picked off, may be thrown into the furrows to rot. Whichever method be followed, the land when finiſhed for ſowing, ought to lie as level, and be as free from lumps, as the border of a garden. Land that has been fallowed ſometime does very well for woad; and I have ſeen it thrive excellently on a broke up piece after the artificial graſſes: but in any of theſe caſes the preparation muſt be exactly the ſame, and the reward will be ſuited to the labour and the care.

CHAP. XLII.

Of ſowing of woad.

THE preparation having been ſhewn, there remains to enquire into the time and manner of ſowing. In each of theſe there is ſufficient matter of choice to the huſbandman, for neither the common manner of diſperſing the ſeed, nor the common time of doing it are ſo proper as what may be adviſed. In the firſt place he is to take care that he buy good ſeed, and that he have enough of it: he is not to count that quantity ſufficient which will do once to ſow the ground. Woad is apt to fail, or to be deſtroyed early in its growth, he muſt therefore have a ſupply of ſeed to let in and make up the deficiencies. Having the ſeed and his land ready, he may ſow it in the common way or by the drill. In the firſt method a gallon of ſeed is enough for an acre, and in the drill method half that quantity is ſufficient, for woad is large in its growth, and a few plants are enough upon the ground. In the common way, the ſeed is to be ſcattered as evenly as poſſible over the ground, by the ſingle caſt, and then harrowed in carefully. In the drill huſbandry it is to be ſown in double rows, with ten inch partitions, and with five foot intervals between two and two. Few crops are more difficult to be well managed in the common huſbandry; but none eaſier in the drill and horſehoeing method. The leaves alſo grow much larger, and are in themſelves much better, this way.

As to the time the common farmer errs as much as he does in the manner of ſowing. The common ſeaſon is the middle of February, but the proper time is the firſt week in Auguſt. Woad ripens its ſeed in the end of July; part of the plants are to be reſerved for that purpoſe; and the ſeed never puſhes ſo ſtrongly as when ſown as ſoon as fit for it. This is the courſe of nature. We ſee the ſeeds of plants ripening in Auguſt and September, naturally fall to the ground ſoon after, and they ſhoot in a few days: their leaves ſtand the winter, and all that time the root is ſtrengthening itſelf in the earth; ſo that when the ſpring comes they are in a condition to ſhoot with ſtrength and vigour.

This being obſerved in relation to woad, the growth will be much ſooner fit to cut for the firſt crop; and every way better. This firſt cutting will be the richer for the time the roots have been in the ground, and the freſh ſhoots will be the more vigorous for the next: it will come ten days or a fortnight earlier in the ſeaſon than it would have done from the ſpring ſowing. The firſt ſhoots of woad are apt to ſuffer by inſects: for this reaſon we have cautioned the farmer always to have a ſupply of ſeed to make up deficiencies; but the autumnal ſowing is preferable; for it prevents them. When the ſeed fails in ſome part, and the crop is ſupplied by freſh, this is a little backwarder than the firſt ſown; and when the fly has deſtroyed a part of the young plants, and more are ſown; this laſt will be ſtill more backward in growth than in the former inſtance. The huſbandman would wiſh it ſhould be all equal, that it might come all to be cut together; but this is not to be obtained, unleſs theſe evils be prevented. This is not to be done without a poſſibility of failing, but it may be made greatly more ſafe by the autumnal ſowing.

I can ſpeak from experience, that the ſeed ſown in ſpring, is more ſubject to fail than that in autumn; and alſo that the fly or grub, is much more frequent in the former than in the latter ſeaſon. The goodneſs of the ſeed depends in a great meaſure on its being new. Seed ſown in February muſt be ſeven months old, and it may be nineteen or twenty months. And it is always the worſe in proportion. It is a common opinion among the woadmen, that two year old ſeed is as good as freſh, but nothing is more erroneous. They complain of bad crops, and 'tis ſtrange they do not ſee into this, which is the principal cauſe. I have made ſome of them try the experiment, and out of twenty new ſeeds ſown, not above one, two, or three have failed; and out of as many old ones, eleven, twelve, or more. I have found alſo by tryals, that out of twenty ſeeds of the ſame crop, ſown a fortnight after their ripening, only two have failed; and out of twenty ſown from the ſame parcel, the next February, four or five.

CHAP. XLIII.

Of managing woad in the growth.

WE will ſuppoſe firſt, that the farmer has followed the old method, and ſown his land in February by hand. In this caſe be will ſee it come up irregularly, and when it has been a week above ground, he muſt obſerve how it ſtands; if the grub or fly have been at work, he muſt ſend in a careful perſon with a dib in his hand, and a parcel of ſeed in his apron. With the dib he is to make holes, and into each hole he is to put five ſeeds; this is to be done wherever the young crop is thinned; and theſe holes are to be a foot aſunder. If the farmer will ſow his woad in ſpring, the earlier he does it the better. This plant will ſhoot in very cold weather, and the earlier the ſeaſon the fewer there are of thoſe inſects: the warm ſhowers of the more advanced ſpring bring them on in abundance. When the plants from this new ſowing have got to a little ſize, the field is to be hoed. This is not only to be done to keep down the weeds; but to thin the crop itſelf, for the plants muſt not ſtand ſo cloſe as they riſe in this random way. The hoers muſt be careful: they muſt thin the plants to about a foot aſunder; and they ſhould leave the ſtrongeſt and moſt promiſing. In this manner they will be refreſhed as well as thinned; and having taken good root, and the preſent crop of weeds being deſtroyed, they may be left to themſelves, for they will not ſuffer any more to riſe among them.

Let us next examine the ſtate of a crop ſown in Auguſt. In this, if the ſeed have been the produce of that year, and the ground well prepared for it, there will be little or no need of examining it on account of deficiencies. The field will be too well covered to need a ſupply; and the flies will have little power. At a proper growth, as in the former inſtance, the hoers are to be ſent in, and they muſt thin the plants in the ſame manner as the others, and thus leave them for the winter. In that time they will make but a moderate progreſs above ground, but they will be all the while ſtrengthening themſelves at the root, which is the owner's true intereſt. They will be juſt ſtrong enough to keep down the ſhoots of weeds, that ſhew themſelves in that cold ſeaſon, and they will grow apace into leaves in ſpring; affording an early crop, and a very fine one; and leaving the beſt foundation that can be for the next. From what I have ſeen practiſed by ſome particular woadmen, in this common way, I ſhall be able to give the farmer ſome uſeful hints. If he ſend in his hoers again in ſpring, to break the ſurface of the ground, and deſtroy all the weeds between the plants, this practice will greatly ſtrengthen and refreſh them. Not ſo much for the injury ſuch a few poor ſtarved weeds could have done, as for the advantage there is in breaking the ſurface of the ground. This ſuperficial hoeing leads us from the common practice to the method we have propoſed for raiſing woad according to the new; and to the advantages of deep hoeing about plants of ſo large a growth.

We have adviſed double rows and five foot intervals, becauſe a third or middle row would want air, and therefore its leaves would never come to their due freſhneſs and colour; and becauſe the land between double rows ſhould have opportunity of good turning. We will ſuppoſe a farmer to have ventured on this method, and ſhall not fear to promiſe him a three-fold ſucceſs. The management of his crop is this: when the plants in his two rows have ſome bigneſs, he muſt ſend in the hoers with their hand hoes. Theſe muſt clear away all the weeds in the partitions between the two where the horſe hoe cannot come; and they muſt thin the plants in the rows. They muſt leave one every fifteen inches, or thereabouts; and theſe alternately, not oppoſite one to another. This will reduce the number of plants on an acre to very few, but the profit will be ſo much the greater. The benefit of woad is not from the ſeed but the leaf; and experience ſhews, that one ſingle and vigorous plant will produce more and better leaves, than five that ſtand cloſe and ſtarve one another.

When the plants are thinned, and the weeds cleared away in the partitions, the horſe hoe is to be ſent into the intervals: this is to plow deep and turn up the ſoil; thoroughly deſtroying the weeds, and preparing the earth to ſupply abundant nouriſhment to the plants. As often as weeds riſe in the intervals, this horſehoeing is to be repeated; and it will be beſt to uſe it alſo at certain times, for the advantage of the crop in particular ſtates. To underſtand this the farmer muſt conſider the nature of the woad: its value is in the leaf; and that conſiſts chiefly in its fine colour and great freſhneſs. The woad draws nouriſhment apace while the leaves are young, and ſo continues till they get a good growth; but toward the time when they are to be cut, being large, they are not ſo fully ſupplied, partly becauſe they require more nouriſhment; and partly becauſe the ground is in a condition to yield leſs. We have ſhewn the occaſion of this, namely, that all ground, from the time of its being firſt broken, and divided by culture, grows worſe and worſe till it is tilled again. Therefore when plants want moſt nouriſhment, they can obtain leaſt; and this is particularly a diſadvantage to woad, becauſe its value depends upon the freſhneſs of the leaf, which depends upon the quantity of nouriſhment it can get juſt at that time. For this reaſon let the farmer who raiſes woad according to the new method of huſbandry, contrive his horſehoeings ſo that one of them may come juſt before the full growth of the leaf for cutting.

There is a time when the leaves of woad have acquired their ſize, and want only their fullneſs and colour: at this period let him bring in the horſe hoe between the double rows. The earth will by this be filled with nouriſhment. The ends of the roots of the woad will be cut off, and new ones will ſhoot from them into the freſh mould: thus in two days the crop will acquire a new aſpect of the true freſh green colour; and if ten days after this horſehoeing it be cut, it will be in the utmoſt perfection whereof it is capable; and the young ſhoots that are to riſe for the ſucceeding crop, will ſhoot with great vigour immediately afterwards. From this it appears, that though a crop of woad may be every way advantageous to the farmer; it can no way bring him nearly ſo large a profit as when it is raiſed by the drill and horſehoeing huſbandry. This practice is uſeful for all plants, but moſt for the largeſt.

C H A P. XLIV.

Of the gathering of woad.

WE left the farmer with his field ſufficiently ſtocked with plants, but not over-burthened with them; and free from weeds. They were in this condition capable of overpowering the weeds in the common huſbandry, and proper directions were given for deſtroying them by the horſehoeing: therefore the farmer had only to wait their growth, for gathering his firſt crop. At what time of the year this ſhall happen cannot be well determined, for it differs according to the manner of huſbandry, and the time of ſowing; and alſo in ſome degree in reſpect of the moiſture or dryneſs of the ſeaſon. Woad ſown in autumn will be fit for a firſt cutting, earlier than that ſown in ſpring; and that raiſed by the drill and horſe-hoeing huſbandry will be ready to cut earlier, and yield the ſecond crop quicker than that managed according to the vulgar practice. For the reſt, as the ſeaſon is better, the crop will be the ſooner ready. As warm and light ſoils are moſt ſuitable to woad, ſo a warm ſun and light ſhowers raiſe it the quickeſt to maturity: therefore the ſeaſon will often make ten days, a fortnight, or ſometimes more difference in the ripening of a crop of this plant.

Let the owner, when it comes near ripening, watch it carefully; for on finding the exact time of this depends a great deal of the advantage. When the leaf is full ſized, firm to the touch, juicy, and of a freſh and fine green, it is ripe: and as ſoon as it is, that ſhould be done. Nature changes ſwiftly, from perfection to decay; and in nothing more than in this growth. If the time of ripeneſs be not ſeized, the leaf preſently begins to fade, it firſt grows flabby, and then loſes by degrees its colour. This firſt accident is very hurtful, but the other worſe. The letting woad ſtand three or four days too long, will reduce a very good crop to the condition of a very middling one. When the leaf is ripe let it be inſtantly cut. As ſoon as cut it is to be ſent to the mill; and the farmer is to prepare for his ſecond crop. Woad yields ſeveral in a year. In the new huſbandry the aſſiſtance of the horſe hoe is ſo great, that theſe are all nearly of equal value, and at the ſame time there are more of them in number; but in the common huſbandry every ſucceeding crop is inferior to the firſt, both in quantity and goodneſs. The woad of the firſt and ſecond crop are ſometimes mixed together; but thoſe which come after muſt be kept ſeparate, or they will much reduce the value of the whole. As to quantity, in the common huſbandry, an acre uſually yields a tun; but in the horſehoeing method there is no doubt of its yielding a much larger ſtore. Woad will ſtand ſome time and yield ſucceſſive crops, but it is not adviſeable to truſt the old roots too long: 'tis therefore to be renewed after the ſecond year, with all the care that we have deſcribed as neceſſary at the firſt ſowing.

CHAP. XLV.

Of renewing a field of woad, and of obtaining the ſeeds.

IT is the courſe of nature in the generality of plants, that the large leaves which riſe from the root, fade when the ſtalk grows up; therefore, as theſe leaves are what the farmer wants from this uſe, he is not to encourage or ſuffer the growth of a ſtalk if he can help it, in the ordinary courſe of his crop: but when he wants ſeed he muſt promote this in certain plants; that he may have ſeed in ſufficient quantity for his future occaſions. We will ſuppoſe him to have gone through the firſt ſummer; what remains of the two years produce will be eaſily underſtood, as to its uſe and management. When he has gathered the laſt crop, the woad will continue growing. It will not riſe to leaves fit for the common ſervice during the winter, but yet what grow at that ſeaſon will not be altogether uſeleſs. The field will afford a very rich, wholeſome, and nouriſhing food for ſheep, and their biting, far from doing any harm, will prepare it for ſhooting ſtronger the next ſpring. After that it is to be managed exactly as the firſt year; and the firſt crops will be as good but not the following. The owner will ſee toward autumn, the neceſſity of renewing his plants, and he is to do it in this manner. When the laſt ſummer's gathering is over, he is to plow up the ground immediately for receiving freſh ſeed: but in this he is to obſerve a particular caution; for he is to leave a part of the old roots: they being to afford the ſeed for the ſucceeding crops. The reſt of the old roots are to be harrowed up and thrown away, and theſe being left, and having the full advantage of the new plowed ground, will thrive at a ſurpriſing rate; and yield the next year ſuch a quantity of ſeed, that an acre will ſometimes yield fifty quarters.

This will appear the more ſtrange when the reader recollects that each pod has in it only one ſeed; but the number of pods upon a plant is in a manner incredible. When the ſame piece of ground is to be in woad for a conſiderable time, this is the method of managing it: but we adviſe the farmer rather to obſerve the caution firſt given, and not keep any piece more than two years in this crop. In that time, if the land were ever ſo rank, it will bring it down to be fit for corn, and if continued longer will impoveriſh it too much. There is no land that can ſtand the exhauſting of ſo large a growth cut ſo often, except it be refreſhed by the horſehoeing huſbandry. In this method the intervals, while they are plowed up for receiving the roots from the rows, enjoy in other reſpects a kind of fallow, and after two years the new crop may be ſowed in the center of each interval, and the places that firſt held the rows will thus become intervals in their turn.

If this ſhould not prove ſufficient to keep the ground in heart, ſome dung may be uſed; plowing it in the intervals. It muſt be old mellow dung. By this practice the land may be kept in ſufficient heart for any thing. There is no crop whatſoever that may not be ſupported thus, ever ſo long upon the ſame piece of land, breaking the intervals often and well, burying mellow dung in them at times, and finally changing, at proper periods, the places of the crops, making that the middle of the interval at one time, which was the place of the rows at another.

CHAP. XLVI.

Of weld, or dyer's weed, and its difference from woad.

BEFORE we enter upon an account of this plant, which may well enough be called a weed, as it grows wild by way ſides, as well as in fields where it is cultivated, it will be neceſſary to obſerve one natural and frequent miſtake that is made about it, as it is an error that may be very prejudicial: this is, the confounding it with woad. Its name weld ſounding like woad, has led ſome into this, and its uſe in dying ſeems to have confirmed them: but notwithſtanding this reſemblance in name and uſe, the plants are altogether different, and the culture that belongs to one does not ſuit the other.

What is the more dangerous in this reſpect is, that thoſe who have written to inform the huſbandman, have too often fallen into the error. Mr. Houghton, whoſe collections on huſbandry and trade are much eſteemed, confounds the two as if they were one plant, and orders for woad what thoſe from whom he learnt meant of weld, and what muſt ruin the huſbandman who ſhould depend upon it. This is to be found in his 381ſt number of the ſecond volume, where his account and the directions following it, do not belong to either woad or weld, but are made up partly of what belongs to one, and partly of what belongs to the other.

This ſhews the neceſſity of thoſe deſcriptions we have prefixed to each of theſe heads, of the plant itſelf: they may have appeared at firſt ſight to ſome ſuperfluous, and to others too particular, but here is a proof that they are in neither fault; that nothing can be more wanted than proper accounts of the plants themſelves, before we enter upon their culture; and that theſe cannot poſſibly be too punctual or exact. Where ſuch a perſon as Mr. Houghton ſhould miſtake, how is the common huſbandman to ſuppoſe he ſhall eſcape; eſpecially when he is deſirous of improving his ground by ſome new product. There is no other way but by a perfect knowledge of the plant itſelf. He who had ſeen weld and woad treated of as diſtinct articles, and had read an exact deſcription of each, could never ſuppoſe them both to be one and the ſame plant, or miſtake one for the other; for ſcarce any two herbs are more different. It is in this, as in all other reſpects with relation to huſbandry, in order to practiſe it ſucceſsfully, the perſon muſt underſtand it thoroughly. This is what we have attempted to inculcate throughout our whole work, labouring to make the moſt ordinary reader know the grounds and reaſons of every thing he is to practiſe; and in every article begin at the foundation.

CHAP. XLVII.

What weld or dyers weed is.

THOUGH the two names may perplex the unexperienced reader, none who has once ſeen woad and weld, can ever in his own mind confound the plants. Woad is a large plant with broad leaves, covering a great deal of ground: weld is an upright, ſlender, and tall plant, ſpreading at the utmoſt over but a very few inches. It grows wild on the banks of ditches, all over England. Culture makes no alteration in it, ſo that he who knows it wild, cannot miſs it in the field. It is very upright, and ſcarce at all branched. The root is white and fibrous, the leaves that riſe from it are long and very narrow. They lie ſpread in a circle upon the ground, covering a ſpot as big as a ſaucer: they are ſmooth, gloſſy, and of a pale but freſh green.

The ſtalk riſes in the midſt, and has a great number of leaves, like thoſe of the root, but ſmaller. From the middle upwards it is covered with flowers: theſe are very ſmall and yellow, and they often ſtand in a kind of ſpike of near two feet long: after them come the ſeeds, which are very ſmall, and are contained in open ſeed veſſels, a vaſt number in each. Each flower ſtands in a ſmall green cup, formed of a ſingle leaf, divided into four ſlender-pointed parts, two of which gape open more than the others. The flower is compoſed of three little yellow leaves, placed one uppermoſt and two ſideways. The upper one is lightly divided into ſix parts; the two ſide ones are each divided into three parts in the ſame manner. Sometimes there are beſide theſe three, two other ſmaller leaves in the flower: theſe are undivided, and ſtand at the bottom, but many flowers are without them. The upper leaf is rounded at the bottom, and has there a little receptacle for a ſmall drop of honey juice; this receptacle is flattiſh, and ſtands erect juſt under the leaf. Within this flower are a multitude of fine ſmall threads, each having a little upright button on its top. In the centre of theſe ſtands the rudiment of the fruit, or ſeed-veſſel; this is rounded, and has three points riſing from it of the length of the filaments. Theſe receive the duſt from the buttons at the tops of thoſe filaments, and convey it down from their tops to the embryo ſeeds in the rudiment. When the filaments and leaves of the flower are fallen off, this rudiment remains in the cup and grows larger, it becomes at laſt ridged and riſing; the three points remain upon it, and it is open juſt at their origin. The ſeeds are numerous and very ſmall. When nearly examined, they are found to be of a kidney ſhape, and they grow to the inſides of the ridges of the veſſel.

This is the ſtructure of the flower and fruit of this plant, it was known to the antients by the name of Luteola, and in ſome places we call it Would, which comes nearer the name of woad than the other. It ought to be called dyers weed, for the ſake of diſtinction. The antients called it luteola, which ſignifies the yellow plant, either from its yellow aſpect when in flower, or elſe for its uſe in dying yellow, with which they were acquainted, and to which purpoſe it is uſed at this time. In this it differs from woad, which does not afford a yellow but a blue colour. The huſbandman can need no advice as to what kind he ſhall chuſe, for there is but one that deſerves his notice. We have a little ſort of dyers weed wild in ſome parts of England, but it is a trifling plant, and not worth notice, the other is ſufficiently diſtinguiſhed from this by its bigneſs.

CHAP. XLVIII.

Of the proper ſoils for dyers weed.

NATURE points out the proper ſoil for this plant, and that is no ſmall recommendation of it to the huſbandman, for a very poor one will do. We ſee it wild, and its general ſituation is upon a ditch bank, or other dry and poor piece of ground; often upon a wall, and very frequently upon almoſt bare ſand, or entire gravel. Nature by this points out a poor, barren, dry ſoil for it; and the farmer who has uſes enough for his beſt land, will be very glad to know what to do with his worſt. Weld will grow upon this with very little expence of dreſſing; and it is a commodity of certain ſale to the dyers, and of no mean price. Let the huſbandman who intends to raiſe weld, fix upon ſome poor, barren, ſandy field; or let him chuſe the drieſt piece of ground he has. Weld will grow upon the pooreſt ground, but it will thrive better, and grow larger upon ſuch as is ſomewhat richer, provided it be of the right kind.

I have obſerved ſeveral pieces of ground to the ſouth-weſt of London, where the ſoil conſiſts only of ſand, and a black mould; this is the beſt ground that can be pitched upon to yield dyers weed in large crops. It is a ſort of land that requires a great deal of manure to make it yield well in the common way of huſbandry, wherefore this would be a great improvement: ſuch land will bear vaſt crops of this plant from year to year, without any expence of manure, and with very little culture. In many parts of Hertfordſhire and Buckinghamſhire, they have dry parching gravels, which yield little in the common way of ſowing, and that at a very conſiderable expence: theſe would alſo bear dyers weed in great plenty.

Theſe ſoils, all poor loams that are over ſandy, and even the heath land that lies dry will bear it; and in many places eſtates may be made by the culture only of this trifling article. When the farmer has found a proper piece of land for it, he muſt examine whether there be a purchaſer for the commodity near him. There are places where there wants the convenience of a ready and unexpenſive ſale. Under theſe conſiderations, few things can be more advantageous than the cultivating this plant, and nothing is more eaſy.

CHAP. XLIX.

Of the ſowing of dyers weed alone.

THERE needs no particular preparation of the land for the reception of this ſeed, but there is none that requires more caution in the ſowing. This may be done either alone or with ſome other crop: the firſt is preferable for very poor ſoils, and the latter for ſuch as are ſomewhat better. When a poor piece of land is to be ſown with dyers weed alone, nothing more is needful than plowing, and once harrowing. As to the time of ſowing, the huſbandman may take his choice of ſpring and autumn, but the autumn is preferable. The ſeed is extreamly ſmall, therefore a vaſt number goes to a little meaſure. This makes a little ſeed by meaſure ſuffice: but there is a great deal of difficulty in ſcattering ſo ſmall and light a ſeed equally over the ground. Let the huſbandman procure good ſeed in the quantity of a gallon to every acre. The farmers have a cuſtom of mixing duſt with the ſeed before ſowing, to make it ſpread the more evenly, but this does not ſucceed. 'Tis ſcarce poſſible to ſow ſo ſmall a ſeed by hand alone, and the beſt crops ſhew how imperfectly this practice anſwers the purpoſe.

We have before us a letter from a very ingenious correſpondent on this ſubject, which propoſes a great improvement founded upon the principles of reaſon, and eſtabliſhed by experience. We thank this gentleman in the name of the public, and wiſh for the ſake of mankind, he would extend his obſervations to more ſubjects, and that others would follow the ſame uſeful ſteps.

To the Authors of the Body of Huſbandry.

GENTLEMEN,

“ Permit me to give you the moſt eſſential proof of my regard for your undertaking, by contributing my mite toward the publick benefit. What I have to relate to you regards a ſingle article, and one uſually eſteemed but inconſiderable; but it is one which I am ſufficiently certain might, with proper management, enrich many a land-owner and farmer. The plant I mean is dyers weed: what I have obſerved and practiſed concerning it as follows.

“ Obſerving that the pooreſt places abounded with this weed, I reſolved to try a crop of it upon a piece of land I had, that ſcarce yielded me any thing; and not having an opportunity of buying the ſeed, I ordered a labourer to gather it from the banks, and other waſte places, when ripe. I am ſituated about eight miles from the ſea, in the county of Eſſex. I went with my labourer to ſhew him the ripe plants, and ſee he made no miſtakes; and thus had an opportunity of obſerving the natural growth of this plant in different places. I found this particular, that upon the ſame ſoil, and under all the ſame accidents, the plants were larger and finer between me and the ſea, for two or three miles, than they were on the other ſide.

“ You will perhaps think it fancy, and imagine that the ſea can have no effect on the growth of a plant, at five or ſix miles diſtance; but having ſtudied botany in my younger time, to me there was nothing wonderful in this; though I ſoon determined to make the diſcovery uſeful. There are on the ſide of my eſtate (for the little land I cultivate is my own) that is next the ſea, ſeveral ſorts of trefoil that are not found on the other ſide, though the ſoil be the ſame; and I have obſerved that ſeveral wild herbs, which will not grow within the reach of abſolute ſalt water, yet either grow in no other places than ſuch as are four, five, or ſix miles diſtant from the ſea; or no where ſo thrivingly.

“ From theſe obſervations, made at a time when I little thought they would be uſeful, it appeared no wonder to me that dyers weed ſhould thrive better within this remote influence of the ſea, than elſewhere; though it grows naturally in all parts of the kingdom. Upon this obſervation, and the practice of our farmers, of mixing dry road dirt among the ſeeds of dyers weed, to make it ſpread more equally in ſowing, I founded the following practice, which anſwered my expectations, and which is the occaſion of this letter.

“ Having got together a good quantity of ſeed, I ſpread it on the floor of a garret to air, and in the mean while ordered my bad piece of land to be twice plowed and harrowed very even. It is one of thoſe brown duſty ſoils that we ſee on the heaths of Suſſex.

“ Having meaſured out five gallons of ſeed, for my piece is near five acres, and this is the common allowance; I ordered ſome fine ſmall red ſand that lies upon our coaſt, to be brought in wet from the ſea, being pared away juſt when the tide was run off. I ſpread

" this to dry a little in the ſame garret, and when it would juſt break " I meaſured two buſhels and a half of it to my five gallons of ſeed; " I ſaw theſe well mixed with a ſmall wooden ſcoop, and then ordered " them to be ſown. This was the ſecond week in Auguſt. The ſeed " came up very regularly and ſtrong, the lower leaves ſtood the " winter, and in ſpring the ſtalks ſhot up: I had my dyers weed ripe " three weeks before my neighbours; and by the concurrent teſtimony " of all who underſtood it, I had twice as much as ever was raiſed " upon an equal piece of ground, in the memory of man.

" This great advantage I attribute to ſeveral cauſes, all owing to " the mixture of the ſand with the ſeed: but having related to you " the fact, which is the uſeful part, I ſhall be ſhort upon the reſt. " My piece of ground was a barren earth, therefore the addition of " the ſea ſand enriched it; for though but ſmall in quantity, the " ſpreading it even was a great advantage.

" In the next place the ſoil was rendered ſomewhat lighter and " warmer than before, both which qualities fitted it the better for this " plant.

" Thirdly, the ſeed was by this means very evenly diſtributed over " the ground, for by ſowing it by hand in a careful manner, when " freſh mixed; and before the ſand was thoroughly dry, the ſeeds " ſtuck to one or other of the grains of ſand, and the weight of the " one carried the other along with it; whereas in the common way " of mixing the ſeed of this plant with dry duſt, the duſt goes one " way and the ſeed another; and though the duſt be very evenly " ſprinkled, the ſeed is not.

" Laſtly, the great aſſiſtance of all I attribute to the ſalt hanging " about the ſea ſand. I doubt not but you very well know how rich " an improvement ſea ſand is to land, and how vaſtly preferable to " that of pit or rivers: in this caſe every thing concurs to make it " take the fulleſt effect. The improvement it makes in the ſoil is " what exactly ſuits it to the crop; the richneſs it gives is conveyed " directly to the plant in its firſt ſhoot, the ſand being ſown with it: " and finally here is the advantage of that little ſaltneſs, which ſo well " agrees with this particular plant, conveyed to land which lies too " remote for the influence of the ſea.

" Whatever you determine concerning my reaſonings, the facts are " certain, and they are ſufficient. I hope to ſee the improvement " communicated to the world by your means, and practiſed where- " ever there is a fit land for this growth, and ſea ſand within a pro- " per diſtance.

" I wiſh your endeavours the ſucceſs they deſerve, and am with " reſpect,

Your humble ſervant,

CHRISTOPHER HAWKINS.

We can add nothing to this account of the beſt method that ever was invented for ſowing of dyers weed alone, but ſhall proceed to the way of ſowing it with another crop.

CHAP. L.

Of ſowing dyers weed with another crop.

AS the ſecond year is the time at which dyers weed comes to perfection, it may very well be ſown with another crop. The ſmall advance it makes under the ſhade of that more ſpeedy growth, during its continuance on the ground, will be ſufficient to give it ſtrength in the root for the enſuing year. Some trouble and ſome charge are ſaved by this; therefore many will chuſe it. There are only two crops proper, theſe are barley and oats: the ſeed is to be mixed in the proportion of a gallon to an acre, with the ſeed corn of either kind; and together with that it is to be rolled into the ground. It will ſhoot up ſoon after the corn, and will continue alive among it, though with a weak aſpect.

As it only ſends up the leaves from the root, and they lie naturally ſpread upon the ground, and will bear trampling, it will get no harm from the neceſſary treading down in the harveſt, nor from the inſtruments. As the roots of the ſtubble decay, and there is no other growth to exhauſt the nouriſhment from the ground, having air and food, it will ſtrengthen itſelf and acquire a look of vigour. In this condition it will ſtand thro' the winter, and then ſhoot up in ſpring; and preſently come to a fine and rich growth. The difficulty is to ſcatter the ſeed equally over the field. This is not done by mixing it ever ſo evenly among the ſeed grain, becauſe the weight of the grain throws that forward, according to the direction of the hand, but this light ſeed does not keep it company. I ſhould be for uſing the ingenious method of our correſpondent, only mixing the ſand in about half the proportion which he allows for the ſowing with it alone. This will have the ſame effect of ſpreading it equally; and, far from injuring, will be an advantage to the corn. This is the beſt method of ſowing dyers weed with another crop, but the other is preferable.

CHAP. LI.

Of the management of a crop of dyers weed in growing.

LESS trouble is required for this than moſt crops, but of the little that is needful nothing ſhould be omitted. When the leaves are of ſome bigneſs, and ſpread with ſtrength, hoers are to be ſent into the ground: they are not only to cut up weeds but to thin the plants. In this caution is to be uſed: the ſhoots will be too thick in many places, but as this is an upright plant with few branches, it may ſtand much cloſer than others. About nine inches diſtance is ſufficient for theſe plants, and if on any part they are thinner by the irregular diſtribution of the ſeed, it will be proper to thin them in other parts, by pulling up inſtead of cutting away the plants, and tranſplanting as many of them as are wanted to theſe.

The field is thus to remain during winter: in ſpring the owner ſhould go over it, and if it be a poor ſoil he will probably find little or no occaſion for more trouble. But if a rich one, weeds will be grown up in it, and in this caſe it muſt be hoed again. This is done at a ſmall charge, and is very well worth while, it perfectly provides for the crop. After this the dyers weed is to be left to itſelf till the time of gathering. The ſtrength it has got at the root in the autumn, and during the ſpring, will be ſhewn in the ſhoot at this time; and no weeds will be able to live near it.

CHAP. LII.

Of the gathering of dyers weed.

THIS is one of thoſe crops that is to be gathered by pulling. This is to be done in the ſame manner as the pulling of flax, but with more care on account of the ſeed. The ſeed veſſels are naturally open, ſo that the ſeed is eaſily ſcattered and loſt: the more as it is ſo extremely ſmall. This the owner is to guard againſt as much as poſſible, becauſe of its price; the ſeed in this crop being no little addition to its value. Though very ſmall it is produced in a prodigious quantity; every ſtalk being half way down covered with ſeed veſſels, and theſe quite full of ſeed, and its price, one year with another, being ten or twelve ſhillings a buſhel.

For the ſaving of this not only a great deal of care is to be taken in the pulling up the plant, but the proper time muſt be watched ſtrictly. This alſo is neceſſary on account of the herb itſelf, and its uſe to the dyer. There is a degree of ripeneſs at which it is ſuited to his purpoſe; before that period it is unripe, and immediately after it changes greatly for the worſe. This period of ripeneſs of the ſtalk is exactly that of the ſeed. When the ſtalk is ripe for the dyer the ſeed has its full growth: it requires only to harden a little, and this may as well be done out of the ground as in. The owner is to watch the colour and aſpect of the ſtalk, and of the ſpike of flowers. The ſtalk is at firſt of a faint green, but when it ripens it grows yellowiſh; this is the firſt ſignal of its growing ready for pulling. Let the farmer examine the long ſpikes of flowers and ſeeds. The whole field generally ripens regularly, ſo that judging by two or three there will be no great danger of error. If there be many flowers on the ſpike downwards, and the ſeed veſſels at the lower part be green and ſoft, 'tis not yet ready; but by degrees theſe ſeed veſſels toward the bottom of the ſpike grow hard, and there are only a few flowers on the top of the plant: then the ſeaſon of gathering approaches. If there have been wet, new flowers continue ſhooting after the veſſels harden, but theſe are not to be regarded. When the weather is fair this condition of the whole plant comes on very regularly and favourably; and the farmer cannot fail of knowing it exactly.

When the crop is ripe the pullers muſt be ſent into the field, with orders to get it all up with expedition. They are to draw it up as upright and with as little ſhaking as poſſible; and then keeping it ſtill upright they muſt tie it into ſmall bundles, and ſet them up to dry. When this herb is dry it is fit for ſale, but the ſeed is of no uſe to the dyer, nor would at all add to the value in his eye. Therefore the farmer is to take care to get it out for his own ſupply, and for market. When the handfuls have ſtood to dry in the ſun, he is to have them houſed; and after a little time he is to ſee if the ſeed be all hardened. When it is he muſt throw the bundles on a floor and thraſh them lightly, to ſeparate the ſeed. A very little violence anſwers this purpoſe. Shaking alone would very nearly do it. When the ſeed is out it is to be left on the floor three or four days to harden, that it may not be in danger of damage by keeping; and then is to be ſwept up and cleaned. The herb is to be ſold to the dyers; and it is ready for them as ſoon as thraſhed. The ſeed is to be ſold, reſerving a ſufficient quantity for the ſucceeding crop, and this is to be ſown as ſoon as it is thoroughly dried. Two good plowings and one harrowing will prepare the ſame ground for it again; and thus two or three crops may very well be raiſed without much expence. After this it is better to change the crop than manure the ground, for dyers weed is one of thoſe plants that do not thrive with dung.

CHAP. LIII.

Of coleſeed.

THIS is a produce confined to a few parts of the kingdom, but that might very well be carried to others. The plant is leſs known than any other among thoſe cultivated for uſe. To aſk what herb it is that yields this ſeed, would puzzle many beſide the farmer. Even its name is not commonly known. Coleſeed is the name of the ſeed only, it is alſo called rape ſeed, but this does not lead to the matter; cole is not the name of any plant, and rape ſignifies turnip. We ſhall explain this, and before we enter upon the culture ſhew the farmer what the herb properly is.

Coleſeed is very well known in Lincolnſhire, and ſome other counties; and rape oil is as well known, which is made from it. The ſeed is known at the ſhops, and the plant by the farmers who raiſe it: but nothing more. In ſome places the ſeed is ſown among the other kinds of what are called young ſalletting; but in this caſe, the firſt leaves are eaten, and no more is ſeen of it.

While this ignorance remains about the form of a very uſeful plant, it is common wild on our ditch banks, and there needs nothing more than to ſhew its ſeed to the Lincolnſhire farmer, for him to ſay that is it. Theſe are the inaccuracies and errors which retard the progreſs of improvements in huſbandry. The articles are themſelves unknown. The price of coleſeed is very conſiderable, reckoning the quantity an acre yields; and if the farmer will be at the trouble of drawing the oil, the method is very eaſy, and his profit will be vaſtly greater. Nor are theſe all the advantages he receives from the growth of this plant: it will grow on ſoils which will not yield any thing elſe to advantage.

CHAP. LIV.

Of the coleſeed plant.

THERE are three plants, each containing ſeveral ſpecies, and diſtinguiſhed by different names, but very nearly agreeing in their flowers, ſeed veſſels, and other general circumſtances; theſe are, 1. The cabbage. 2. The turnip; and 3. The navew. The confuſion that has been made among theſe, has been one occaſion of the uncertainty about the coleſeed plant. The root of the turnip, and the ſtalk of the cabbage, are what principally diſtinguiſh them; as to the navew it differs very little from the turnip, and that principally in the ſmallneſs of the root. The flowers of all theſe are alike, and the ſeeds reſemble one another, and they will all yield rape oil; but there is one kind that affords it in greater quantity than the others: this is the wild navew, called Napus Sylveſtris by authors, and this is the proper coleſeed plant.

Authors figure a wild navew, and this is what we have on the banks of ditches. We have obſerved that the navew differs little from the turnip, except in the ſhape and bigneſs of the root; and this plant, which otherwiſe much reſembles the turnip kind, has a long, but very ſmall root. We generally receive the ſeed from Holland or Flanders, and I have obſerved that the ſeed from different places is not all of the ſame kind. I have ſeen a field of the yellow turnip raiſed from coleſeed, brought from Flanders; and another of a particular plant of the cabbage kind, from ſeed from Holland. Theſe were equally called coleſeed, and they anſwered the purpoſe; the ſeeds were ſmaller in the firſt, and duſkyer in the latter, than thoſe of the wild navew or right coleſeed plant, but they each yielded a good quantity of oil.

Any of theſe kinds therefore will anſwer, but as the wild navew yields much the finer ſeed, and much the larger quantity of it, and is alſo richeſt in oil; 'tis beſt to cultivate that only. The proper coleſeed plant, or wild navew, is four foot high. The root is long, ſlender, and white, 'tis of a ſweet taſte like a turnip, but with ſomewhat more warmth. The lower leaves are long, large, deeply divided at the edges, and of a duſky green. One ſtalk uſually riſes in the midſt of theſe: this is round, ſmooth, of a pale green, and divided into many branches. The leaves ſtand one by one, not in pairs, they are ſmaller and narrower than thoſe from the root, and are of a paler colour. The flowers grow at the tops of all the branches, they are ſmall, of a bright yellow, and perfectly reſemble thoſe of the turnip: after theſe come pods, which contain the ſeed. This reſembles turnip ſeed, but it is larger and ſmoother.

This is the wild navew of our fields and on banks. When it is cultivated for coleſeed it grows ſomewhat taller and more branched; the flowers of the coleſeed plant, when nicely examined, are thus formed. They ſtand in a cup compoſed of four little oval pointed green leaves, and this does not remain after the flower is faded, as in the dyers weed, but periſhes and falls off with it. The flower is compoſed of four plain narrow yellow leaves, placed croſswiſe. They are of the ſame length with the leaves of the cup. In the center riſe ſix filaments, four of theſe are conſiderably longer than the other two: they have ſmall pointed buttons growing on them. In the midſt of theſe riſes a ſmall upright rudiment of the ſeed veſſel; this has a kind of button at its top, in which there are ſmall openings for receiving the fine duſt out of the heads of the filaments. When the leaves and cup of the flower are fallen, this part enlarges, and at length becomes a ſeed veſſel of a longiſh ſhape, divided in the inſide by a membrane, which ſhews itſelf beyond its extremity, and containing ſeveral large, round, bright ſeeds. The ſeeds of the natural wild plant may be gathered and ſown; but thoſe from ſuch as has been cultivated raiſe the ſtouteſt plants, theſe therefore the farmer is to chuſe, according to the following marks.

CHAP. LV.

Of the choice of the ſeed.

THE ſeed of the navew is this right and proper coleſeed; it is very large, ſmooth, and of a fine bright colour. All the ſeeds ſold under the name of coleſeed reſemble one another, but the worſer kinds are either ſmaller or of a duſkyer colour, and leſs ſmooth ſurface. 'Tis eaſy to be deceived, till they have been ſeen together: but after this the right kind will always be known by ſight, and the careful huſbandman will be in no danger of miſtaking. Coleſeed is eaſier damaged than corn. It conſiſts of a great deal of ſoft pulpy matter, under a thin ſhell or cruſt, therefore it is naturally moiſt. If it be not carefully kept it will grow damp, and this is a certain deſtruction to it. Let the huſbandman take care that he buys dry ſeed, and ſuch as has been always kept dry; not what has been damp and dried again. He will know this by the colour and the ſmell. No ſeed is ſo apt to damage by moiſture, and in this caſe it gets a raw muſty ſmell, which never goes off entirely, though it be ever ſo well dried afterwards. Alſo as ſoon as it becomes damp enough to be damaged, it loſes the fine bright colour on the outſide, and this it never recovers. The ſweetneſs and brightneſs of the ſeed are the great marks of its being in good order. As ſoon as the ſeed is bought, if the ground be not entirely ready for it, ſpread it on the floor of a dry airy garret.

Although the plant is equally a native of England and Flanders, it thrives more in the latter place, and ripens its ſeeds better; ſo that they are more perfect, and are fit for the production of the ſtrongeſt and largeſt plants. Flemiſh ſeed is always to be had; and it will be to the farmer's advantage to get it. The people in Lincolnſhire and Northamptonſhire ſow the produce of their own crop, but this from time to time dwindles; and there is no compariſon between a field of coleſeed raiſed from ſuch ſeed, and one from Flemiſh, other circumſtances being equal. All ſeeds ſhoot the quicker and the ſtronger for being new; and none ſhews the difference more than coleſeed. I have ſeen the experiment tried by Mr. Greſtone, who for curioſity ſowed the ſeeds of ſeveral of his own ſucceſſive crops, and tried them in a piece of garden ground near one another. The laſt years ſeed was up five days before ſome of the old, and above a week before others; and the number of plants from the ſame quantity was alſo greater. The newneſs of the ſeed may be known by the clearneſs of the colour. Let the huſbandman get a quantity of this good ſeed from abroad for his firſt attempt, and he may if he pleaſes ſow the produce of that for two years more upon his land; but at the end of that time, it will be neceſſary to have recourſe to the ſame foreign ſeed, to keep up the credit of his crops; and if he will be at the additional expence of foreign ſeed every year, he will be repaid with great intereſt.

CHAP. LVI.

Of the proper ſoil for coleſeed.

WHEN the farmer has procured good ſeed, let him pick out the moſt proper piece of his ground for the crop. This will depend on the two articles, ſoil and ſituation; the richer the land the better; and it ſhould lie tolerably dry. There is no part of England where ſo much coleſeed is raiſed as in the fens, but the lands are firſt drained that are intended for this purpoſe: they cultivate it alſo in Flanders and Holland on grounds originally marſhy; but they are at all the neceſſary pains and expence of making them properly dry firſt.

No lands are more fit for coleſeed than ſuch as have been ſubject to overflowings, but they muſt be ſecure from that accident while the crop is upon them: and muſt be properly dry, to receive it. Whether this overflowing have been from land floods, great rivers, or the ſea itſelf, it prepares them equally for the crop. Thoſe where ſalt water has come, are properer than any others; but they require ſomewhat more preparation. There are parts of Eſſex where the huſbandmen might raiſe coleſeed to great advantage: and in many places where grounds have been newly recovered from the ſea by banking, coleſeed is an excellent crop. Every piece of fat rich land is proper for it; and it will yield to his full content. If he has a piece of ground too rank for wheat, let him ſow it with coleſeed: this will yield an extreamly rich encreaſe, and the land that would not before have done for corn, will be perfectly well prepared for it by this means. The right ſoil for coleſeed is mellow earth. The plants never grow ſo robuſt, nor the ſeed is not formed in ſuch plenty, or ripened in ſuch perfection on any other. This is the reaſon that marſhy and fenny lands, when properly fitted for the purpoſe, anſwer ſo well.

CHAP. LVII.

Of preparing the ground.

THE ſoil we have recommended does not require great labour in tilling; nor does the coleſeed demand any particularly to its own management. This black mellow earth cuts eaſily, and turns freely under the plow; and when it is in a proper degree of dryneſs, breaks finely in the working. All that is neceſſary to fit it for coleſeed, is to make it very fine; and this is a condition whereinto it is brought eaſily.

In May the land intended for coleſeed is commonly fallowed: in June it is twy-fallowed; and in the latter end of that month, or the firſt week in July, the coleſeed is ſown. After the laſt plowing, a fine toothed harrow ſhould be drawn over: after this, if the weather be dry, let there be a light roller carried over it: then let it be very gently and tenderly harrowed again. This laſt harrowing makes it as even as the flower border in a garden, and this is the proper condition wherein it is to receive the ſeed. If the weather prove too wet, let the rolling be deferred; and afterwards performed with great caution: for tho' the roller may do great good in this caſe, it may alſo do much harm. In ſome lands the ſoil is naturally ſo looſe, but once harrowing divides it ſufficiently.

CHAP. LVIII.

Of ſowing the ſeed.

THE farmer is to make his choice which method he will follow, that of the old, or that of the new huſbandry. If he chuſe the old, his neighbours ſoon will ſhew him that it is eaſy to reap a large advantage from this growth; and it will be the greater to him as he the more ſtrictly follows the cautions we have before given, relating to the choice of ſeed, and other articles. If he will uſe the horſehoeing huſbandry, he will reap a greater advantage. This method is ſo new, that we have not in all caſes an opportunity of recommending it upon experience; but in many wherein we have not had the advantage of a trial, we may ſafely propoſe it from reaſon. The value of this crop, is the quantity of ſeed. This will be the more as the plants are ſtronger; and there is no doubt but they will be much ſtronger when they are raiſed by the horſehoeing method.

There are other advantages of this growth; but this of the ſeed is the principal, and deſerves the greateſt notice. The huſbandman may have either a great many plants growing irregularly on his field; or a ſmaller number diſpoſed regularly: he is to conſider which of theſe will yield him the greateſt quantity of ſeed, and he may be certain this will be from the larger plants. In irregular growing they ſtarve one another; and the earth between them cannot be ſtirred to any depth for nouriſhment: therefore they will be ſmall, and will ſhoot up in height like herbs raiſed under ſhade; and will have few branches. In the other method they will be robuſt, and will ſpread every way in branches, and all theſe branches will be full of ſeed veſſels. The number will be greater, and the ſeeds will ripen to more perfection; becauſe the plants ſtand at a diſtance; and the earth can be turned up by the horſehoe between them. In the common way, five pounds of the ſeed is allowed to an acre. In the drill method two pound and a half will be full enough: and two rows may very well be drilled at ten inches diſtance, with a five foot interval between them.

CHAP. LIX.

Of ſowing coleſeed in the drill way.

IN the common way, coleſeed is to be ordered in the ſame manner as turnips. When it is got to ſome ſmall height, hoers are to be ſent into the ground, to cut down the weeds, and thin the plants To thrive well in this way, they ſhould be ſuffered to ſtand at about ten inches diſtance.

When the haſbandman ſhall raiſe this crop by the drill and horſehoeing method; they muſt be hoed when they have got a little ſtrength. We need not repeat the particulars, the ſame management ſhould be obſerved as in hoeing of turnips, raiſed by this huſbandry. The weeds in the partitions are to be cut up with a broad hand hoe; and the plants ſhould be at the ſame time thinned till they ſtand but one every foot and half, and theſe not oppoſite in the two ſeries, but one in each row oppoſite to the middle of the ſpace between two in the other. When the plants are cleared out and thinned, let the horſehoe be ſent in as ſoon as any weeds appear in the intervals. This is to be repeated as often as the weeds riſe, obſerving, that at firſt the plow is to tear up only the middle of each interval; and afterwards that it come nearer the edges.

The farmer need not be uneaſy at the diſtance of his plants, or at the ſpace of ground that is left vacant between every pair of rows. They will yield the more. They will grow robuſt, and as it is their nature to ſend out on every ſide a great many branches: from theſe there will ſhoot others; and they will all be loaded with ſeed veſſels, ſo that moderately ſpeaking, and judging from what is ſeen in the courſe of this method of huſbandry in other kinds, one plant may be expected to produce as much ſeed as ſix in the common way.

CHAP. LX.

Of managing the crop.

WHICH ever method of raiſing the crop be uſed, the owner is to conſider, that it has more uſes than one. Though the ſeed be the principal conſideration, it is not the only one; and the more regard is to be ſhewn to another, becauſe it comes in order of time before it. This plant is of the eatable kind: as it does not grow ſo much into root as the turnip, its leaves are more delicate. Sheep are very fond of them, and they afford a rich and wholeſome nouriſhment. This is a great article. The ſheep are ſupplied at a time when they extreamly want nouriſhment, and the crop is improved by it.

Coleſeed having been ſown in the beginning of July, ſhoots with ſome ſtrength; keeps itſelf up during the droughts of autumn, and getting new ſtrength and ſize in the leaves from the rains, which introduce the winter, becomes in a condition to reſiſt the ſtrongeſt froſts. It ſtands well, and on every open day or two, grows during the depth of winter; ſo that in January, February, and March, the ground will be well covered. The leaves which now riſe, are of no real uſe to the plant in perfecting its ſeed: that is to be done the ſucceeding ſummer. If they grow very rank they rather are injurious, ſwallowing up too much of the nouriſhment which ſhould go to the forming of the young ſtalk: therefore they may be ſpared without injury. Here is a great ſupply of food for ſheep, at a ſeaſon when graſs is low, and the ſheep may be turned in without any damage to the ſucceeding crop.

Some ſow coleſeed for this uſe alone; and it anſwers the intent very well. They uſe the pooreſt land for this purpoſe, and although the plant would never grow vigorous and ſtrong ſo as to yield any profitable quantity of ſeed, it ſhoots up very well in leaves. In proper lands, the leaves at this ſeaſon are much finer and ſtronger. There are thoſe who prefer the cole plant on theſe poor lands for food for ſheep, to the young growth on ſuch as is richer, and they ſay it is more wholeſome; they are not without reaſon, but their experience on this head ſhould not have led them to diſcard the uſe of coleſeed for feeding on rich ground, but to uſe it with diſcretion. The diſadvantage that attends the feeding of ſheep on the rank growth of coleſeed in rich ground is, that it makes them ſwell. This is the ſame conſequence that is taken notice of in the feeding them on clover: but it is eaſily remedied. 'Tis only at firſt that this rich food takes ſo ill an effect, and it may be prevented by proper regulations. When the ſheep are firſt turned in, let it be toward the middle of the day; and an hour before ſun-ſet let them be driven out again into a common paſture. The next day let them be turned in earlier, and driven out later; and ſo the third, fourth, and fifth. After this let them be juſt driven out at night for two or three days more, and let in again in the morning. This will prevent the effect of the coleſeed at firſt,

and

and being now uſed to it, they may be left in the fields altogether. The firſt ſhoots of coleſeed are not all that ſerve this purpoſe. There is another growth of them leſs rank, and the ſheep love it better.

We ſhall in the next chapter treat of the gathering of coleſeed, and ſhould after that name the ſhoots which riſe from the ſtumps: but theſe being a food for ſheep, we ſhall treſpaſs upon regularity, to avoid dividing this article of their feeding. The ſhoots of the coleſeed after gathering the ſtalks for ſeed, are the mild, ſweet, and wholeſome food we have been naming. Theſe grow very ſtrong when there has been rain, but they are never rank. Every one knows the difference there is between the cabbage and coleworts; full grown leaves firſt cut for the pot, and the ſprouts that grow on the ſtumps and ſtalks after cutting; the difference is the ſame between the firſt growth of large leaves from the coleſeed plant, and the ſhoots that riſe after the cutting down the full grown ſtalks for ſeed.

The root of the cole plant is very ſtrong, it does not decay when the ſeed ripens, but the crop being cut for that purpoſe, the ſtrength below ſoon ſhews itſelf: a great number of ſhoots riſe from the part of the ſtalk where it was cut off, and from the joints between that and the root; and ſome from the top of the root, ſurrounding the ſtalk. If the coleſeed plants have been cut up for ſeed in the end of June, theſe ſhoots appear about the ſecond week in July. They make but a ſlow progreſs while the weather is dry and ſultry; but when ſome rains come, they riſe apace. Theſe all tend to ſtalks, and would form ſo many new plants for ſeed, but that would not ripen well, nor would come in any quantity; therefore it is not the farmer's intereſt to encourage it, and the beginning of the ſhoot is at a ſeaſon when the weather ſeldom favours its riſing to any heighth.

Before theſe young ſhoots get ſtrength for riſing to ſtalks, the cold mornings come in, and ſtop them, ſo that they continue ſmall and low; but they grow buſhy from the nouriſhment they receive from rains. This is juſt what the farmer deſires, and they grow more and more fit for the ſheep, and are in excellent condition at the time when they are moſt wanted.

The farmer muſt conſider the condition of his ſtock, and the value of the land on which this crop is to grow: he will thus be led to know how far it is proper to encourage, or ſuffer the ſtanding of it after the gathering for ſeed. If he find it adviſeable to continue the growth, he may vaſtly increaſe it by a proper management. If it be ſown at random, it muſt be handhoed juſt as the ſhoots appear. Nature may be left to herſelf for a little time, after the ſtalks are cut down, and will give ſtrength enough to the roots to make the ſhoot; but if a dry ſeaſon follow, theſe young ſhoots will turn yellow.

In this caſe it will be proper to clear the ground between the ſtumps, and the deeper the hoers cut the better. The weeds are few and ſmall that can ſtand upon a coleſeed ground, ſo that the deſtroying theſe is but a ſlight part of the deſign in hoeing: its great advantage lies in breaking the ground, and making it better receive and detain the dews.

This hoeing has another uſe, which is the cutting aſunder ſome of thoſe fibrous roots that ſpread from the bottom of the ſtalk, under the ſurface. Each broken root will ſend out many new ones, and theſe will have a freſh earth wherein to ſpread. From this, which is the method in the common way of huſbandry, we ſhall proceed to that more beneficial way of doing it by the horſehoe, when the plants have been ſown by the drill. Nothing is of ſo great ſervice as breaking the ground well while the plants are growing upon it. If he reſolve to continue the crop, it is to be effected in the common method, by promoting the young ſhoots, but this is only for a time: on the contrary, in the horſehoeing method, the ſame piece of land, if the farmer think convenient, may bear coleſeed for ever, and that in a beneficial method: not only for the crop, but the feeding.

We ſuppoſe the coleſeed raiſed in double rows, with proper intervals between pair and pair. In June the plants are vigorous, and they will ſoon be ready for cutting. The intervals afford ſpace for the management of the plants; and as ſoon as they are cleared off, and the ſeed thraſhed out, theſe are to be plowed up with the horſehoe. This furniſhes the roots of the old plants with abundant nouriſhment, ſo that they ſhoot up the ſprouts with ſtrength; and at the ſame time double rows of freſh ſeed may be ſown in the middle of each interval for a ſucceeding crop. Both will flouriſh greatly: the leaves from the roots of the new ſown plants, and the ſprouts from the ſtumps of the old ones: theſe laſt will grow with a particular freſhneſs and vigour, becauſe all the working of the intermediate earth for the ſowing of the new crop, will be ſo many additions of tillage upon tillage for them; and the roots of the ſeedlings will not ſpread ſo far at firſt as to interfere. Thus they will flouriſh together during the remainder of the ſummer, the autumn, and the winter; and in early ſpring, there will be a double ſupply of food for the ſheep.

In the end of March when the ſprouts are eaten down, for the ſheep having their choice of both, will be fondeſt of them, they are to be plowed up by the hoe plow; and the places where they ſtood are to be made the intervals for the new crop. This new ſucceſſion will by the time juſt mentioned, have ſpread out their roots in abundance toward the places where the old crop grew: the plowing up of the roots of that crop, will break and cut off thoſe of the young plants; and this earth being thoroughly broken, will be full of nouriſhment, and ready to receive them. Thus the ground will be by the ſame operation cleared and tilled. The plants will be vigorous, and full of ſeed; and the crop will be ripe and ready for cutting, a fortnight ſooner than in the common way. In this manner, only repeating the ſame management on every new occaſion, the ſame piece of land may be made to yield a continual ſucceſſion of coleſeed crops, without fallowing; and, if it be tolerably good earth, without manure.

One thing we muſt caution the farmer who ſhall have the ſenſe and ſpirit to raiſe coleſeed this way, which is guarding againſt the too great luxuriancy of the ſprouts. They advance ſlowly during the ſummer, in the common way, and it is to his advantage, for otherwiſe they would run up to ſtalk. If rains happen ſoon after cutting the old plants, this accident will happen in the common way, becauſe more nouriſhment is ſupplied than is wanted in the leaves; and the ſame thing happens much more certainly from the deep plowing the intervals, when raiſed by the drill and horſehoeing method: therefore if rain falls ſoon after, or if the ſhoots are over rank without, let him go round the field, and with his thumb and finger knip off the top of every ſhoot that is running up to ſtalk. By this the advance upwards will be ſtopped, and the abundant nouriſhment will furniſh new ſhoots upon the ſides of the firſt. There will thus ſtand, as it were, a foreſt of green low buſhes without one ſtalk riſing toward flowering: for when ſuch as were moſt forward are nipped this way, the cold weather coming on checks them, and all the nouriſhment they draw from that abundant reſource of tillage, will go to enlarge the firſt leaves and to form others. A little obſervation of what paſſes in the common courſe of nature, will ſhew the farmer how eſſential it is to nip theſe riſing ſtalks.

It is not a crop of ſeed he now wants, what he in this caſe deſires to have is a ſupply of leaves, for the food of cattle; and the merit of this crop is, that theſe leaves be numerous, freſh, and full of juice. Let him obſerve what happens to the leaves of other plants: when they have all the nouriſhment to themſelves, they are numerous, freſh, and full of juice; but when the ſtalk has got to any height, and the rudiments of flowers appear, the nouriſhment taken in by the root all goes there. The leaves become dry and yellow, the older fall off; no new ones grow in the place, and in fine all decay, and the ſtalk alone remains riſing naked from the root. The uſe of the leaves which riſe firſt from the root, is the ſame with that of the beautiful parts of the flower. Although theſe ſeem the perfection, and greateſt beauty and excellence of the plant, they are intended only to ſhield and defend the little rudiment of the ſeed veſſel, in their centre: in the ſame manner that fine ſpreading ſhew of leaves, which firſt riſe from the root of a plant, are in reality of no other uſe than to ſecure and preſerve the little rudiment of the ſtalk, which is hid in their centre. As ſoon as the duſt from the little buttons in the flower has impregnated the rudiment of the fruit, the gaudy leaves decay and fall off, the nouriſhment being all conveyed to the uſeful part, the fruit or ſeed veſſel; and in the ſame manner, as ſoon as theſe leaves have defended throughout the winter the young bud of a ſtalk, and that by the heat of the ſpring begins to riſe in height, and ſhew its buds for flowering, all the nouriſhment is conveyed to it: the lower leaves have done their buſineſs, and they fade and periſh.

The caſe is the ſame in the ſhoots from the old ſtumps of coleſeed, as in the leaves from the root at the firſt ſowing. The tufts of leaves that riſe from the top, and from every joint of the old ſtump, have the rudiment of a ſtalk within them. This is the purpoſe of nature, but it is the farmer's buſineſs now to check it. When it riſes the leaves fade, but ſo long as it is kept down, all the nouriſhment will be given to the leaves.

CHAP. LXI.

Of the gathering of coleſeed.

TOWARD the end of June the coleſeed plant will be fit to cut. The huſbandman muſt keep his eye upon his field carefully toward that period. It is of the utmoſt importance to ſeize it when it comes. No day of the month, or other preciſe time, can be named, becauſe the differences of ſoils and ſeaſons promote and retard the ripening; and even the variety of management, or age of the plant, may make ten days or a fortnight difference in two fields of the ſame ſoil the ſame year. As the ſoil and method of culture may make a great alteration in the time of ripening, he muſt be upon the watch accordingly; expecting it earlier by a fortnight in rich ſoils and from the moſt careful conduct, than he need in poor land in the common way. The coleſeed plant has ſmall flowers on the tops of the ſtalks, which when the leaves fall off are ſucceeded by pods. As the firſt flowers are followed by the ſeed veſſels, others open upon the tops; which ſhoot up continually higher. When the plant begins to flower, nothing is ſeen but a little tuft of buds at the top of the ſtalk; but when it has been ſome time flowering, the branches having lengthened, from their beginning to flower, all that part which was the top, and where ſucceſſively the former flowers appeared, is covered with ſeed veſſels: thus each branch terminates in a ſpike of ſeed veſſels a foot or more in length.

The quantity of ſeed is the value of the crop. It would appear at firſt ſight, that the longer the plant ſtood, ſo long as it continued flowering, the more advantageous would be the growth; but there are limits to this encreaſe, beyond which all is waſte. The courſe of nature is to ripen theſe ſeeds, and then ſhed them upon the ground for producing the plant again. When ripe the pods open of themſelves, and the ſeeds are loſt. This no art can prevent; and for that reaſon the time is to be watched when any of them begin to open, and that is the moſt exact period for gathering. When a new flower is formed, the rudiment of the pod from which the laſt fell, is but ſmall; it continues to encreaſe before it begins to harden, or properly ſpeaking to ripen, ſo that ſeveral ſucceſſive young ones are left by the flowers before any one is ripe. This is the occaſion of the length of the ſpike of pods, while all are yet entire. When they begin to open, let the huſbandman be ſpeedy in gathering, for he will deceive himſelf very much if he imagine it as well to let it alone awhile, ſuppoſing the new formed pods at the top will make amends for the old ones that are loſt at the bottom: the loweſt pods are the faireſt always, and three of the young ones will not ſupply the place of one of them.

The farmer underſtands the period whereat his crop is to be gathered; and it will be eaſy for him to judge at ſight when it is about to arrive at that condition. The length of the ſpikes is one obvious token; while they are ſhort the crop cannot be fit to gather, becauſe, while they are in that condition there are but few of them, and none are ripe. When the ſpikes have a conſiderable length, their colour is to be regarded. The pods while young are always green, as they grow toward ripeneſs they loſe that colour; at firſt they become pale, then yellowiſh, and laſtly brown.

The whole ſpike, while very young, is green. When ſome of the pods approach toward ripeneſs they change colour, and the greenneſs is only ſeen at top; when, upon a curſory view, there are ſome found to grow browniſh at the bottom, and thoſe in the middle are yellowiſh or pale, thoſe at the top only being green, the time of gathering is at hand. It is the intereſt of the owner to let them ſtand ſo long as all are ſafe, but no longer. He is therefore now to look into the field once every day, in a more ſtrict manner. He muſt examine the bottom pods of the ripeſt ſpikes; and as ſoon as ſome of them begin to open the time of gathering is come, for after this every hour's ſtanding will be attended with loſs.

The beſt method of cutting coleſeed is with a ſtrong ſickle, as wheat is reaped: but this muſt be done carefully. There is no part of the farmer's occupation that requires more expert and honeſt labourers. The ſtalks are thick, and by that time the ſeed is ripened, they are grown hard. They are not eaſy to be cut, and yet that muſt be done evenly, and with little ſhaking. Care is to be taken, that the ſickle goes eaſily thro' them, and when ſeparated from the root they muſt be laid gently down in handfuls, that they may dry. One third part of the ſeed is ripe at the time when the loweſt pods are ready to open: in the lying expoſed to the heat of the ſun, more than another third hardens, and becomes good; ſo that above two thirds of the whole quantity of pods yield good ſeed, and this is all that can be expected. If the farmer were to ſtay for the ripening of the other third, while growing, he would loſe the ſeed from the lower pods, which is much more valuable.

In the common way of ſowing, 'tis difficult to lay the handfuls well to dry from the reaping, and a great deal of the beſt ſeed is loſt for want of this advantage; but in the way by drilling it is eaſy, for the intervals will ſerve excellently for ſpreading the plants. When the crop has been once laid on the ground it is not to be ſtirred till dry, for the ſeeds in the lower pods are ſo looſe, that they will ſhake out with the leaſt motion. What is required from this expoſure is, to dry and harden them, and they will get this ſufficiently by lying thin, without being moved. If the weather be hot the buſineſs is done the ſooner, generally from ten days to a fortnight is ſufficient. The proof that they are dried enough is, when the pods toward the upper part of the ſpikes open eaſily, and the ſeeds in them are hard.

CHAP. LXII.

Of thraſhing the plants, and the uſes of the ſeed.

WHEN the crop is in this condition, nothing is required but to get it to the barn, and thraſh it. In Lincolnſhire they ſave themſelves a part of this trouble, by thraſhing it in the field: they ſpread a large ſheet upon a level part of the ground, and lay a quantity of the herb on it: a little thraſhing ſerves to diſlodge the ſeeds, which are already looſe. I have ſeen this practiſed without much loſs, but it is an irregular and awkward method; it leaves the farmer's produce at the mercy of the winds, and cannot be performed ſo well as within doors. The method I would recommend, if the ground be near home, is this, let a parcel of large ſheets be ſpread in the field, and the dried ſtalks carefully taken up in their bundles, and laid on them. Each ſheet will hold a great deal this way; for though the parcels muſt be very gently moved to the ſheet, they may be preſſed hard, and handled roughly there; for what ſeeds fall out will be ſaved.

When the ſheets have as much in them as they will hold, the edges and corners are to be gathered in and faſtened, and the ſeveral parcels carried to the barn: there they are to be thraſhed with a careful but light hand, that all the ſeed may be got out, and as little of it as poſſible bruiſed, for it is tender and eaſily hurt; eſpecially when freſh. After it is ſeparated from the refuſe, it muſt be ſpread on a floor, and turned often till it is thoroughly hardened. The ſeed thus prepared for keeping is alſo in a better condition for uſe, than when too green: the farmer may ſell it, or ſend it to the mill on his own account to be ground and preſſed for rape oil; the ſale of which is certain, and the price, conſidering the charge, tolerably high. If the ſeed be ſold as ſoon as thraſhed and dry, it brings from eighteen to two and twenty ſhillings a quarter, and the produce at an average in the common way of management, upon middling ground, may be reckoned at five quarters to an acre. Much more advantage may be made of it, if the farmer will have the oil drawn himſelf; and in the method we have propoſed by the drill and horſehoeing huſbandry, it will be eaſy for him at any time to double his profits: in many caſes, taking all the neceſſary care, and making the moſt of his produce, he may make it treble.

In the new method the ſame piece of land may be made to bear coleſeed ever ſo many years in ſucceſſion. According to the vulgar practice the ſeveral kinds of corn may be ſown after it. In Northamptonſhire, where the land is rich, they find coleſeed a good preparer of it for barley or wheat; in Lincolnſhire, where it is not ſo good, they ſow oats after it. The uſe of the coleſeed is not over when the oil has been preſſed from it. The cakes that remain are a large quantity, and as the freſh leaves feed ſheep, theſe turn to a very good account for feeding of cows. In winter this is an excellent food: keeping them in heart and ſtrength, at a time when graſs is ſcarce.

Calves may alſo be fed with coleſeed cakes, but that in a particular manner. After the oil is preſſed out as clean as the common practice can obtain it, there ſtill remains ſo much of it in the cakes, that when they are beat to powder, and mixed with hot water, they make it white and milky. This is the way of giving it to calves, and it proves a very rich, wholeſome, and ſtrengthening food. They may be fed with this from three days old, till they are fit to eat graſs or hay.

In Flanders and Holland, where coleſeed is raiſed, and its oil is preſſed in great quantity, they make both theſe uſes of the oil cakes: it is ſurprizing that in many parts of England, where they raiſe this crop, they know no other uſe of the cakes than as firing. In Lincolnſhire they heat ovens with them, while they want winter proviſions for their cows.

CHAP. LXIII.

Of liquorice.

Hitherto we have treated of articles known to be raiſed by huſbandmen, in different parts of the kingdom, and familiar by name among country people; here we mention one which, being leſs common in the profeſſion, may make ſome of the common practiſers of huſbandry wonder at its being added to the liſt. They know liquorice by name, and they are ſenſible that it brings a large price at the druggiſts: much of it is imported from Germany, and other parts of Europe, but very conſiderable quantities are raiſed in ſome parts of England, and may be in many others. Great gains are to be made in huſbandry by going out of the common road; and this is one of the inſtances.

The root of the liquorice plant is a yard long, and as thick as a man's thumb. It is ſoft but very tough, brown on the outſide, and yellowiſh within: it is full of juice, and though not eaſily broken, may be beat out into a kind of thready ſubſtance: its taſte is very ſweet and pleaſant, it ſpreads and increaſes greatly in the ground, and is leſs in danger of accidents than moſt other roots. The ſtalks are tall, firm, and tough; they are a yard or more in height, they have but few branches, they are of a brown colour, and are covered with a kind of clammy moiſture. The leaves are like thoſe of the tare, each compoſed of a great many ſmaller ones, placed on the two ſides of a ſtalk, or a middle rib. The flowers are of the form of thoſe of the tare, but ſmall and inconſiderable; and they are ſucceeded by pods, which are ſhort and flatted.

The flower of the liquorice ſtands in a ſmall green cup, compoſed of a ſingle leaf, hollow at the bottom, and toward the upper part is divided into two lips; the upper lip is again divided into three parts, two narrow and pointed at the ſides, and the middle one broader and nicked in the middle: the under lip is undivided, and is narrow and pointed. The flower is compoſed of four leaves, in the manner of all the tare kind. In the body of it are ten filaments, one ſtands alone, and the other nine in a cluſter; at the tops of all theſe there are round buttons; and in the midſt riſes a ſmall lump, which is the rudiment of the pod; this is buried in the cup, and ſends out a long filament pierced at the top, to receive the duſt from theſe buttons for impregnating the ſeeds.

When the flower has fallen off, this rudiment by degrees enlarges into a ſhort, flat, and ſharp pod, in which are a few kidney-ſhaped ſeeds. There are two kinds of liquorice beſide the common, diſtinguiſhed by having hairy, and the other prickly pods, but theſe are not worth the farmer's notice; the ſmoothneſs of the pod diſtinguiſhes the right genuine liquorice uſed by the apothecaries, as does alſo the bigneſs, juicyneſs, and fine taſte of the root; the others have ſweet roots, but they are harder and leſs pleaſant.

The common liquorice is a native of Germany, France, Spain, and Italy; we have it not wild in England, but being natural to climates ſo much reſembling our own, it grows with us in perfection. It was well known to the antients, who called it Adipſos, becauſe it conquers both hunger and thirſt. Theophraſtus mentions it under the name of the Scythian root, Scythia being the firſt country where it was known to be cultivated. It ſerved thoſe people by way of nouriſhment; they would live a long time upon this root and mare's milk cheeſe, without ſeeking after any other food. With us it is raiſed in ſome parts of Yorkſhire, Nottinghamſhire, and Surry: and may be introduced in other places, to the great benefit of the induſtrious planter.

CHAP. LXIV.

Of the proper ſoil for liquorice.

ALmoſt all plants thrive beſt in a rich ſoil; but liquorice will not grow in any other. This ſoil muſt run deep. Its length of root, which is the great advantage, cannot be expected in any other. We expect to ſee the root a yard or more in length, and it muſt have free paſſage, otherwiſe it will not grow ſtrait: this regularity of ſhape is not only a beauty, but a real advantage, for the crooked roots are never ſo tender or juicy as the others, nor do they ſo ſoon arrive at their due growth.

The proper ground for liquorice is that which has a deep coat of mellow earth; a black mould that begins directly under the turf, and runs three ſpit deep, without any great mixture of other matter in the way. This is the beſt natural ſoil, but there are others which will anſwer. The next ſoil is a deep rich loam, that has not much of the clay in its compoſition, and has a good deal of fine garden mould among it. The third natural ſoil is the deep, warm, ſandy kind, which is not barren, but with its lightneſs and warmth has ſome richneſs. In all theſe the depth ought to be at leaſt a yard, before there is any hard bottom, and that muſt be examined; for if it prove a clay the liquorice will never thrive, becauſe of the coldneſs and dampneſs that naturally attends ſuch an under ſtratum, the wet lodging upon it.

The liquorice requires four articles in the ſoil: depth to penetrate, lightneſs that it may make its way eaſily, warmth to promote its growth, and richneſs to ſupply it nouriſhment. Theſe advantages it enjoys in various degrees in the ſeveral natural ſoils we have named, for no one of them has them all in perfection; and therefore it may be poſſible by art to provide a mould for the growth of liquorice, which ſhall be better than any of theſe.

In the mellow earth there is depth, lightneſs, and richneſs to ſupply it nouriſhment; but this ſoil is apt to be cold: there wants therefore the fourth article warmth, to promote the ſpeedy encreaſe of the root. In ſome of the loamy ſoils there is lightneſs, depth, and warmth, but there wants richneſs; and in the ſandy there is depth, lightneſs, and warmth in the greateſt degree, but there wants richneſs and nouriſhment. The effect of theſe advantages and diſadvantages I have regarded in the obſervations I have made on the places where I have ſeen it grow. In Yorkſhire, where the ſoil is a mellow rich earth, the liquorice is very large and juicy, but it grows ſlowly; in Nottinghamſhire the ſoil is loamy, and the liquorice grows moderately, but is inferior to the Pomfret kind; and in Surry, where the ſoil is ſandy, the root grows quick, but it is meagre, dry, and poor, it never has the fine juicy texture, or rich taſte of the Yorkſhire kind.

From theſe advantages and defects in the plantation of others, the judicious farmer will find the way to make the beſt profit of his own; by adding what is wanting in each, and avoiding what is amiſs. In the preceding obſervations we ſpeak of theſe ſeveral ſoils as left to nature, for when they are manured they are changed; and it is impoſſible to deſcribe the ſoil of any place, as altered by the various means of culture.

To theſe ſeveral grounds, for the ſervice of this article, we are to add the made ſoils about London, where there is a great deal of liquorice raiſed to a conſiderable profit. This is large and juicy, but it is not ſo good as the Yorkſhire root, it is leſs tough, and is more ſubject to accidents, nor has it the fine yellow colour, or true rich taſte. It will grow mouldy if laid up in damp ſand, whereas the Yorkſhire kind will keep perfectly well in that manner for a long time; and when beaten out for uſe the threads are more wet, and as it were rotten; they have not the ſtringy firmneſs of right liquorice: the plant is the ſame in all theſe conditions, 'tis the ſoil only that makes the difference. The liquorice of Surry is ſtarved, that of Nottinghamſhire is but half nouriſhed; that raiſed in gardens about London is over ſupplied with nouriſhment, and that is of too rank and moiſt a kind: the ſame is the caſe with many other of the products of theſe common gardens, though leſs regarded.

We ſee by the ſeveral natural ſoils, and their effect, and by that of the made ground about London, that each of the others may be improved; conſequently that a made ſoil may be better for liquorice than any of them, but we ſee at the ſame time, that the garden ground about London is not the right kind. What the careful huſbandman is to learn therefore from theſe ſeveral obſervations is, that there is an eaſy way of mending any natural ſoil, for the production of liquorice; and that whatever his ground naturally be, he may convert it into a proper ſort by additional mixtures. The defects and faults of thoſe ſoils on which liquorice is propagated in different counties of England, are ſo oppoſite to one another, that it is eaſy to improve any one of them, by a mixture of the other; conſequently, if the farmer have a ſoil of the nature of any one of theſe, he may improve it and encreaſe his annual produce greatly, by mixing with it ſome other ſoil of the nature of one of the others. If he have a mellow earth, or deep black mould, of the nature of the Pomfret kind, liquorice will grow fine, but ſlowly: therefore let him, when he digs up his ground, mix with it a good quantity of ſand: this will make it grow quicker, while there is yet enough of the natural richneſs of the earth to feed it well. If his ſoil be loamy as that of Nottinghamſhire; or ſandy, as that of Surry, let him add mellow earth to it: he will thus make his liquorice rich, while the natural condition of the ground continues to haſten its growth. He ſees the effect of manure about London, and he finds it has advantages and faults. The advantages are owing to the ſpirit of the dung, and the faults are owing to its rankneſs.

Having laid before him the reaſons of every thing he is to do, I ſhall add what I have myſelf practiſed with ſucceſs, for the raiſing this ſpecies; and lay down what I am convinced is the beſt method of improving and preparing a ſoil for it. I had a field of an acre, or ſomewhat leſs, the ſoil was a good light loam, but not very rich, and it ran near three foot deep, with a firm gravel at the bottom. It came into my mind to try it for liquorice, and I prepared it in this manner; I threw on thirty load of very old and well rotted dung; and forty load of mud, from the bottom of a river that ran near it. All this I plowed deep in, and repeated that operation till it was thoroughly mixed with the natural ſoil. This had before been of a yellowiſh or orange hue, and ſandy, but when this addition was well wrought, in it looked black, and broke mellow, in the way of garden mould. This field bore the fineſt liquorice I ever ſaw, and I have examined moſt that is raiſed in England.

CHAP. LXV.

Of planting liquorice.

LIQUORICE, though raiſed in fields, requires a ſort of garden culture. The ſpade is a more proper inſtrument for preparing the land, than the plow; for it requires to be broke and rendered fine, to a depth that field inſtruments never reach. There is this comfort to the huſbandman, that if the land require a very expenſive tillage; leſs of it ſerves: a few acres will yield a vaſt produce; and the price is ſo much greater than that of moſt other things he can raiſe, that there is no reaſon to grudge the charges. The ground is firſt to be dug up carefully, but this is not to be done in made ſoils, till the additions have been thoroughly rotted in the ground.

Suppoſing an earth improved as in the laſt chapter, by the addition of rotten dung and mud, theſe are to be plowed in toward autumn, and the whole is to be broke again once or twice during the open weather in the ſucceeding winter, for the dung will not otherwiſe thoroughly break and mix with the ſoil. If it remain in ſtrings or cakes, it will not be eaſily broke by the ſpade; and if it remain whole, it will break in upon that perfect lightneſs of the earth, which is ſo eſſential to the growth of liquorice.

When the ground has lain thus the remainder of the winter, let it be dug about the middle of February. The labourers muſt dig every part thoroughly, no leſs than three ſpits deep; and as they lay it, they muſt break every lump, that the ground may be ſmooth and level at the ſurface, and in a manner as fine as ſand all the way down. When the ground is thus prepared, the liquorice is to be planted. The firſt care is, the choice of proper ſets or plants; and the ſecond is, the placing them in the ground. For the choice all depends upon their being in good condition, and having a good bud, or eye. They are to be got from the ſides, or the heads of the old roots; and their beſt length is a foot, or thereabouts.

Toward the beginning of March, the ground will be prepared, and the ſets are to be planted in the following manner: let there be got a gardiner's line, of ſuch length as to reach croſs the ground if ſmall; if larger, it may be removed from diſtance to diſtance. Beſide the line, there is to be a ſetting ſtick, a foot and half long, with a handle like that of a ſpade, and a point armed with a ſquare piece of iron in the manner of a very large ſpike. Let the ſtake to which one end of the line is faſtened, be ſtuck into the ground a foot from the edge of the dug part, and the line let looſe, that the other ſtake may be carried to the other end of the ground, or as far as the line will permit; then it muſt be ſtuck into the ground, at the ſame diſtance of the edge of the wrought part.

Let the planter, taking his ſets in his apron, and the ſetting ſtick in his hand, begin to plant, placing the firſt ſet at half the ſticks length from the edge of the ground. When he has ſet this, let him meaſure from it along the line, the length of the ſetting ſtick, and then plant another, and ſo on to the end. Let the end of the ſetting ſtick, which is pointed with iron, be thruſt into the ground, and preſſed till near the whole be in; let it not be ſtirred about, that the earth may not fall together. The ſetting ſtick being gently drawn out, there will remain an open hole of about ſixteen inches deep. Into this a ſet of the liquorice is to be put, thruſting it carefully and evenly in, till the head of it where the eye or bud is, be one inch beneath the ſurface: then the end will be about the bottom of the hole, and a little mould being drawn over the top, the ſet is compleatly well planted. One being ſet in the reſt is eaſy. The ſetting ſtick is to be laid along the line, its point juſt at the head of the ſet, and its other end marks the place where the next is to be planted: the length of the ſetting ſtick being a foot and half, and that being the moſt advantageous diſtance at which liquorice can be placed in the row.

This ſecond ſet is to be planted in the ſame manner, and ſo on till there be a row planted all along the line. When one row is planted, the next is to be let into the ground. As the beſt diſtance for liquorice is a foot and half in the rows, the beſt diſtance of the rows one from another, is two foot and a half; and in theſe they ſhould not be ſet directly oppoſite one to another, but in the chequer or quincunx order.

The firſt row being planted, one of the ſticks is to be removed two foot and a half by meaſure into the ground, and then the other; tightening the line. Thus there is a row marked out at the diſtance of two foot and a half from the firſt. Let the planter take a freſh parcel of the ſets, make his firſt hole directly oppoſite the middle ſpace between the firſt and ſecond ſet of the former row. When the firſt ſet is planted there, let him lay down his ſtick from the top of that ſet, and meaſuring the diſtance of a foot and a half there plant another.

When this ſecond row is planted, the line is again to be removed two foot and a half farther into the field, and a third row planted. The ſets in this are to be placed directly oppoſite to thoſe in the firſt; and thus every four plants of the firſt and third row, will have one plant of the ſecond row in their centre. This method is to be continued interchangeably thro' the whole field, and this is what is called the quincunx manner of planting; the effect is, that every way wherein one looks at the plantation, when the ſtalks are riſen, there appear regular rows of them the whole extent of the field, with regular alleys between them. If the farmer aſk, whether this be the manner in which liquorice is planted in thoſe places we have named, we ſhall anſwer him, that it is not. They no where allow ſo great a diſtance to the plants; but this is an error that has prevailed in every article of huſbandry, and which we hope to ſee ſet aſide one after another in them all.

Having given the method which experience ſhews to be beſt, we ſhall inform him what is the common way, if he chuſe to follow it; and ſhall lay before him the reaſons of our particular rules on each head. In this let us not appear to any too minute and circumſtantial. The gardener may ſay we need not direct him how to draw his line; but it is not to him we are writing, it is the farmer we are informing in the ſeveral articles of his profeſſion; and ſo much of the gardeners buſineſs as is needful to him, we ſhall convey in few words, in which he will not think us too particular.

The common way of planting liquorice is with leſs regularity, and at ſmaller diſtances. In Yorkſhire they allow nine inches in the rows, and a foot and a half between row and row; and in ſome other places, they plant the ſets at a foot diſtance every way, but without any regard to lines or rows. In the random way of planting, all that can be done afterwards to promote its growth, is to hoe the ground between; but in the method in rows, the earth may be dug at times between them, which is of the greateſt advantage: and thoſe who have a mind, may plant or ſow any ſlight rooted crop between.

We have ordered a large ſpace, but the growth will be large accordingly. Any one who can count, will be able to ſay how vaſtly greater a number of liquorice roots there will be in a field planted at nine inches, or a foot diſtance; but liquorice is not ſold by number, but by weight: and we will affirm, that the quantity of liquorice will be at the ſame growth much greater in the diſtant than in the near plantation.

The common inſtrument uſed for ſetting liquorice is what they call a dibble; this is the handle of an old ſpade, with a roundiſh iron point. The diſadvantage attending the uſe of this is, that the hole is made at once too large for the ſet, becauſe of the thickneſs of the inſtrument: then as the dibble is round, the earth is more apt to fall in than when it is made with a ſquare point. For this reaſon, the planter when he has ſtuck the inſtrument into the ground, is obliged to work it round, in order to ſecure the holes remaining open. This has two diſadvantages, for the hole being too big at firſt, is thus made much more ſo; and the ſides are caked and hardened like the ſurface of a clay bank. When the ſet is put in, a little looſe mould is thrown in about it, and a little more drawn over the top. This is all the planter does, and often this but very ſlightly. The conſequence is the failing of many plants. The liquorice is in a kind of well; which, when rains come, naturally fills with water, and this in the cold mornings, frequent in the beginning of March, chills and damps it. Often it grows mouldy, and periſhes; often it is checked in ſuch a manner, as hardly to recover it in a long time; and very often it grows rotten in part, though it ſurvives the damage. This damage continues with it in the whole growth.

Our inſtrument ſets aſide this danger. It need not be ſo thick as the dibble, conſequently the hole is better ſuited to the ſlenderneſs of the ſet; and there is this double advantage in the ſquare ſhape of the point, that the earth remains firmer when the hole is firſt made; and the angles being ſmall, it the ſooner breaks in and fills up, cloſing about the ſurface of the root. To this purpoſe it is beſt, if the wood part of the inſtrument be made ſquare as well as the iron point, and with ſharp edges. This, in well wrought ground, opens a hole juſt fit for receiving the ſet; every part of the earth immediately on putting it in, breaks and cloſes about it; ſo that the whole root is lodged in a bed of fine, ſoft, and pliable mould, and is in the midſt of its proper nouriſhment.

CHAP. LXVI.

Of the management of liquorice when in the ground.

THE ſets being planted in rows two foot and a half diſtance, and at a foot and a half in each row; their tops furniſhed with good eyes, and buried with about an inch of good mould; the earth is finely to be raked, and the ſurface of the field left even. The heads of the young plants will quickly appear: toward the latter end of ſpring there wlll be weeds in the intervals, and in the ſpaces between plant and plant in the rows. They will be leſs abundant afterwards, becauſe the liquorice will be better eſtabliſhed; but theſe deep-rooted plants do not draw the nouriſhment away from thoſe ſlight annual weeds, like thoſe other larger growths which ſpread out nearer the ſurface.

The weeds are now to be deſtroyed, and though this might be very eaſily done with a hand hoe, there will be more advantage in an inſtrument which cuts deeper into the ground. The ſucceeding operations of this kind muſt be more deep than this firſt: the beſt way is a breaſt plow, and a hand hoe of a particular form. The breaſt plow is to be of the common ſhape, only ſet to cut deeper; and the hoe for this uſe ſhould be narrow, ſharp, ſtrong, and moderately hooked. Both ſhould have a good ſteeled edge, which may be well ſharpened; for the ground in a liquorice plantation is ſo fine and looſe, that there is nothing to blunt them, and they may be worked with great eaſe. The breaſt plow is to be puſhed along the intervals between row and row, coming near, but not too near to the heads of the plants; and the hand hoe is to cut up the weeds between plant and plant in each row. This is to be done firſt, the other afterwards. Great care muſt be taken that the tops of the liquorice plants are not cut off in the hand-hoeing; for the cutting off the top is a great ſtoppage in the growth of the root.

When the weeds are turned in, being annuals, they will almoſt entirely rot, and ſerve as manure. There will be no roots of perennial plants in the ground, for they will have been picked out in the ſeveral dreſſings; the ſeeds of annuals are continually coming in by accident, and they muſt be deſtroyed as they riſe. As it will be ſome time before any others riſe to a height, there muſt be care taken of them when they do. Not that the breaſt-plowing is to be repeated. It will be ſufficient to ſend in labourers with the proper hand hoes, and to have them cut up all that appear, twice during the ſummer; or if it prove a very rainy one, three times. This may be done at little charge, and the only care is to avoid cutting or wounding the plants. In autumn, when the leaves are fallen, it will be proper to dig up the whole ground one full ſpit deep between the rows.

Two months after this, when all is ſmooth and even, let there be ſcattered a ſmall quantity of very rotten dung all over the field. This will cover the tops of the plants, and defend them from the ſeverity of the froſts, that are now to be expected; and the rains that fall afterward, will diſſolve the rotted

dung,

dung, carrying its riches into the heart of this looſe earth. Thus let the dung lie till ſpring, and then taking a time when the earth is between wet and dry, and will work eaſily, let the intervals between row and row be all thoroughly well dug again one good ſpit deep as before. This will bury the dung among the mould, where it will work by its latent fermentation, and break as well as enrich it farther. The remainder of the growth is to be watched and hoed during ſummer, and at autumn the earth is to be once dug between the rows.

In this manner the liquorice is to ſtand three years. The profits of a field of liquorice are ſo large, that they over-pay abundantly the time and expences, compared with any other.

CHAP. LXVII.

Of the taking up liquorice for ſale.

THE time liquorice root takes to grow to perfection, is two years and a half; that is, three ſummers and two winters. The time of gathering the roots for ſale, is late in autumn. We read in Quincy's diſpenſatory, and other popular books, that roots are beſt taken up in ſpring, for reaſons obvious to all: if they had been as obvious to the writers as they were expected to be to the readers, I ſuppoſe thoſe gentlemen would have named them: we ſhall ſet the farmer right in this reſpect, by giving him directions juſt contrary: and ſhall give thoſe reaſons on which the taking them up in autumn is founded.

Two things are required in the perfection of roots, that they be full of juice, and that the juice be rich. On the firſt depends their good condition, and on the other their preſerving that ſtate. When they are flabby they are never full of virtue, and when being plump and full, their juice is watery, it evaporates quickly, and the roots loſe their good appearance, and their weight.

To make the moſt of my liquorice, I have taken it up at both ſeaſons, and tried the difference. In autumn the root is full, plump, and very firm to the touch: its colour is deeper on the outſide, and the yellow within is clearer: its juice is thick, and the taſte ſweet. In liquorice taken up in ſpring the root is very plump and full, but it wants firmneſs: its colour is paler on the outſide, and it is of a muddy but pale yellow within. It is very full of juice, but that is thin and watery, and the taſte is leſs ſweet and leſs rich than in autumn.

Theſe are reaſons why the autumn ſhould be preferred for the time of taking it up: but theſe are not all. When taken up at autumn it will keep a conſiderable time without waſting: on the other hand, liquorice roots taken up in ſpring quickly change. They loſe a great deal of their weight, and will grow flabby, and wrinkled, and they will ſooner grow mouldy. Experience ſhews this: and I apprehend the reaſon to be, that the juices in the root of liquorice taken up in autumn are rich, and of the nature of the plant, having in the greater part been contained in its veſſels, during a conſiderable period of the ſummer. Whereas thoſe juices which fill it ſo plentifully in ſpring are principally water, juſt taken into the root, and intended for the ſupport of the ſtalk that is to ſhoot; a part of them being in due time to be converted to that rich and proper juice, which ſwelling the root in the end of ſummer contains the virtue of the plant.

Theſe ſeem natural reaſons, and they are confirmed by experience, for the roots are every way greatly preferable that are taken up at the end of ſummer. In annual plants which run to ſeed, and in ſome of thoſe perennial ones which bear a great quantity of ſeeds, the root becomes impoveriſhed after the time of flowering; ſo that autumn would be the worſt time of all for taking up ſuch, but they are only a few, and liquorice is not of the number. The beſt time of taking up ſuch roots is when the ſtalk is juſt riſing, for then they are full of thoſe rich juices which were intended to nouriſh the flowers and ſeeds.

The farmer is to take his liquorice up when the ſtalks and leaves are juſt withered: for then it is fulleſt of virtue, fitteſt for ſale, and, if there be occaſion, for keeping. The beſt way is to have the purchaſer ready before he begins to take it up, and he will find, the produce will not be leſs than ſeventy pounds an acre.

To this general and particular account of liquorice, we ſhall ſubjoin a letter written by a planter of Pomfret, in the year 1730, to ſhew the ſtate of the culture and produce at that time:

"Planters of liquorice divide the roots under two ſeveral denominations: thoſe they call the ſtocks, are the tops or crown buds; from whence the liquorice root is cut off: the runners are ſmall running roots, with eyes about two inches diſtant from each other, and run about two inches below the ſurface, three or four foot long. Theſe runners (before planting) are cut into lengths of about five inches long, three eyes to each plant; though two eyes, if they are ſtrong and good, will do.

"If the ground has not been liquorice before, it muſt be trenched over, two foot and half, or three deep; the roots in ſoft ſandy earth, will run ſix foot deep: the ground muſt be manured, or covered over with rotten horſe dung, which muſt lie a month, or more, to conſume, before it is dug in. A little lime is requiſite, if the ground be ſtrong: but that is done after the dung is dug in;

" and the lime muſt be turned in about ten days before planting; or " elſe it will ferment, and heave and thruſt the roots out of the " ground again.

" Before planting you are to line out your ground, by a rod of " three foot long, for each bed's breadth, and within that ſpace tread " a narrow alley, the width of a man's double feet, or both his ſhoes " going one by another, moving ſtrait forwards by the line, which " makes this direction, and which is about a ſpade's breadth; with " which alſo you are to throw up the earth out of theſe alleys, upon " the tops of the beds; the alleys to be about eight inches deep. " Then draw up the ſides of the beds with a ſtrong rake; and (as " gardeners term it) cog the beds with it ſo, as to make them round " at top: which done, lay the beds in three rows; one row on the " middle of the ridge or bed; and the other two on each ſide, a foot " from the middle; and the buds in the rows at ſix inches apart; firſt " a ſtock or crown bud, and then three runners betwixt; then with " a large dibber, made of the upper part of an old ſpade, eight " inches in length, as is uſed to plant out garden beans, you are to " plant out your buds and runners; and beginning at one end of the " ridge or bed, take the bud in your left hand, and the dibber in " your right, make the depth of the hole the full length of your " dibber; then force the bud with your left hand to the bottom of " the hole; and you are to cloſe it, by thruſting of the dibber down " again ſideways, pretty near the ſame hole, as is done for cabbage " plants, &c. And ſo working towards the left hand, it will go on " apace: thoſe who practiſe ſuch works much, will do it very expe- " ditiouſly.

" The ſides of the beds muſt be drawn up juſt after the buds are " planted, ſo as that the holes which the dibber left may be filled up, " in order to cover the roots, and keep out the wet.

" The firſt year after liquorice is planted, you may ſow a few oni- " ons and carrots upon the beds, not to ſtand, but to draw whilſt " young; and thoſe but very thin: and as far as you can reach with " your hand, you may ſow a few radiſhes and lettuce; and in the " autumn you may alſo ſow ſpinage, which grows very fine for the " ſpring following, and which may be cut before the liquorice grows " much, eſpecially on the ridge. The profits which ariſe from hence " may, in this one year, be well computed at twelve pounds ten ſhil- " lings an acre; which we ſhall make appear by-and-by, when we " come to ſtate the debtor and creditor of this commodity.

" Liquorice at Pomfret, and other places, is never in perfection till " it has ſtood three years; and many there be that let it ſtand four, " if it look healthful and lively: for propagation, the runners for " ſets are ſold by the ſtone, at the ſame price as liquorice itſelf is at " that time; but the ſtock or crown buds carry near double the " price. The tops are annual, growing the firſt year about a foot " high, the ſecond year two foot, the third year four foot; and " thoſe tops are always cut off in froſty weather; which keeps the " roots from tearing. The green is beſt to be clipped off with gar-

" den ſhears the firſt year, becauſe of its being not ſo ſtrongly rooted " as afterwards it will, when it may be mowed with a ſcythe. The " flowers come out in Auguſt and September; but it very ſeldom, or " never flowers till the plants are three or four years old: they are " blue, and hang out in ſmall treſſes, like the ſenna's, but above " three inches long: the ſtocks are like thoſe of raſberries, only " ſmooth, and the leaves like ſeedling aſhes.

" Liquorice is taken out of the ground from Martinmas to the firſt " of April; but the latter ſeaſon is the beſt, both for the liquorice " and the buds. When you take it up, ſort the ſmall from the great; " from which laſt you are to dreſs the chats with a fine knife: then " lay them in ſand, one layer of ſand, and another layer of liquorice; " but wet not the ſand with any more moiſture, than juſt ſo as that " you can hold it in your hand without running out any water; but " it ought to be rock ſand, ſuch as is dug out of pits about Pomfret, " Nottingham, and other places. You are to order the running " buds or runners in the ſame manner, if early taken up: but the " crown buds will do, if thrown in a heap, and covered with " mats, &c.

" The ſmall liquorice is, for the moſt part, dried on a malt kiln, " after it is chopped ſhort with a hatchet, or ſome other edged tool, " and then grinded to powder in a mill; which is the readieſt com" modity of all: or elſe it is pounded in a trough whilſt it is green, " and put into a maſhing tub, and maſhed with cold water two days " together: then it is to be wrung out clean, and the juice boiled up " in an iron pot to a black ſubſtance, called Spaniſh liquorice, and " at the place before-mentioned, where it is raiſed, called liquorice " cakes. The cakes they make at Pomfret are round and flat, with " a ſtamp reſembling the antient caſtle of that town, now in ruins. " Within the top of which caſtle there are two acres of land, at this " time employed in the propagation of this noble, uſeful plant.

" It is further remarkable, that one acre of the ground juſt men" tioned, has yielded five hundred ſtone weight, which is generally " ſold for three ſhilings and ſix-pence per ſtone, in one crop: which " muſt be accounted good advantage; for in three years it amounts " to eighty-ſeven pounds ten ſhillings; which is little leſs than thirty " pounds per acre, one year with another. Nor is the charge of " tillage ſo dear, by a great deal, as hops and ſeveral other improve" ments are.

" Before I finiſh this account, ſays this noted correſpondent, I " cannot but remark, that about ſeven years ago all the liquorice at " Pomfret was monopolized and engroſſed by a ſet of merchants, &c. " But the engroſſers, by ſending too great a quantity together, " found, to their coſt, that it heated and ſmoaked like a hay-reek " put up too green. Which I mention by way of precaution to thoſe " that raiſe great quantities, who ought not to lay above two hun" dred ſtone in a heap; for though this may ſeem a great quantity, " yet a much larger has been taken up, and tranſported, or kept in " one parcel.

“ When liquorice is to be tranſported, all that is deſigned for preſent uſe is tied up in ſeven or fourteen pound bundles, neatly rolled up, and bound with packthread. But the only way to be taken is to ſend it by water, and then to lay it in dry ſand, or any other dry ſoil, a layer of liquorice and a layer of ſand; ſo that the ſand runs all over it, and amongſt it; and ſo an apothecary may keep it good for a twelve-month in his cellar. As for tranſporting of the roots for planting, if the ſmall eye roots, or runners and buds, were ſo tranſported in ſand, it were better for them, than to be ſent naked; eſpecially if it be a great way, and they are like to lie out of the ground long. If for a journey of fourteen days, they may be ſent in bundles cut ready for planting; but if they are to be out of the ground longer, then they mould and rot. They ſhould not be mixed head and tail, if you ſend them any diſtance; but muſt be bound up in little bunches, as above, and tied all one way, for readineſs of planting. As for the crown buds, they may be ſent by ſea, with a little ſand to them, being much hardier than runners are.

“ At the town of Pomfret are about fifty acres of ground, called liquorice garths, many of them in ſmall apartments, which entitle the poſſeſſors to as many votes for members of parliament, as they are poſſeſſed of thoſe ſmall parcels of land. All which cauſes the land tillage to be very dear, the common labourers having one ſhilling per day, and two drinkings, which amounts in all to at leaſt fourteen or fifteen pence per day. But there are many other places, where it is found by experience, that there is as good liquorice raiſed, as at Pomfret, and where men and buds are very eaſily procured.

“ As to the expences of planting and preſerving of an acre of liquorice, the price of the roots differ in proportion to the price that liquorice bears the year you ſend for them: when liquorice gives three ſhillings a ſtone, fourteen pounds to the ſtone, then crown buds give five or ſix ſhillings per thouſand; and runners, cut into lengths, and tied up in bundles, give three or four ſhillings a thouſand.

“ Old planters of liquorice reckon that eighty thouſand of plants will plant an acre: but computing twenty plants to a yard, and four thouſand eight hundred yards to an acre, then an acre requires ninety-ſix thouſand, at one hundred ſixty ſquare poles to an acre, thirty yards to a pole ſquare, and twenty roots to a yard; as may be ſeen in the example.

160 Poles in one acre,
30 Yards in a pole,

4800 Number of yards in an acre,
20 Roots to a yard,

96000 Total of roots to an acre.

“ Now as they generally plant one fourth of ſtock buds, and three fourths of runners, then there will be required,

	l.	s.	d.
24000 Stock buds, at 5 s. per hund. when cheap	6	0	0
72000 Runners, at 3 s. per hund.	10	6	0
The charges of preparing the ground will be about	4	0	0
Weeding, the firſt year, about	4	9	0
Weeding the ſecond year, for it is not hoed, but weeded by the grub and hand, at	3	0	0
The ſame operation the third year, at	3	0	0
The taking up and bundling the laſt year, at	3	0	0
The charges in all, about	33	15	0

“ So that from what goes before, and what will by-and-by follow, it is plain that an acre of liquorice will, one year with another, as to the debtor and creditor of it, ſtand as in the under-written ſcheme, the whole being taken at an average for three years,

DEBTOR.

	l.	s.	d.
Three years rent of the ground, at 5 l. per acre	15	0	0
The whole charges of planting, weeding, and gathering	33	16	0
To the vicar for tythe, at 2 s. per pound, i. e. 10 s. per acre for three years	1	10	0
In all	50	6	0

CREDITOR.

	l.	s.	d.
Five hundred ſtone of liquorice, at 3 s. 6 d. per ſtone	87	10	0
A crop of onions, &c. the firſt ſummer	1	0	0
Some winter's crop for that year	2	10	0
In all	91	0	0

DEBTOR and CREDITOR ballanced.

	l.	s.	d.
Debtor to rent, &c.	50	6	0
Creditor in goods ſold	91	0	0
	40	14	0

“ Which is above ſixteen pounds a year per acre clear profit, for the raiſing of liquorice.

“ To finiſh this account it is plain, from what goes before, that fifty ſhillings an acre is allowed for the firſt winter's crop; but if the ground be ſowed with Michaelmas onions, carrots, lettuce, &c. there ſeems to be no reaſon why all the three crops may not be worth half as much, at leaſt, as the one ſummer's. And perhaps "the ſame methods might be taken in other winters, when the ſtalks "are gone, as uſed to be done on beds, at leaſt, as it's uſed in the "alleys of aſparagus plantations. And by this it appears, that if a "planter was poſſeſſed of an hundred acres of liquorice, and had "a vent for it, it would bring him in near two thouſand pounds a "year, clear of all expences. But an hundred acres is too much for "one man, or in one county; and ſo no more of that.

"And thus, Sir, have I given you as good an account as I could, "concerning the raiſing of liquorice at Pomfret, at leaſt as good a "one as the time you gave me would allow; though I am, I think, "pretty ſure that there is little or nothing omitted which is material, "and abſolutely neeeſſary to be known in this affair. I wiſh you "good ſucceſs in all your undertakings,

And am, your, &c.

J. P.

"P. S. Our liquorice garths take up ſo many hands, at the time "of year, that there are ſcarce any labourers to be got, at any "rate, for other works."

CHAP. LXVIII.

Of ſaffron.

SAFFRON is a little plant, raiſed for a ſmall part of its flower. It has a ſingular aſpect when growing; a field of it, at the ſeaſon of flowering, looking like a garden. It is of the nature of thoſe flowers called crocus, from its Latin name; and it is not unworthy a place among the ornaments of a garden. The root is roundiſh, ſingle, and large. It is one of thoſe called bulbs, in all reſpects reſembling that of the garden crocus. It is covered with a brown ſkin, and has a tuft of fibres from the bottom. The leaves are numerous, narrow, and long, like graſs, and of a dark green colour. The flower is ſingle, it riſes from the midſt of the root, and ſtands but a little height above the ground, but it is very large. The colour is a blueiſh purple, and in the midſt of it riſe thoſe particular filaments, or blades, which are the ſaffron.

We have given a particular account of the flowers of thoſe ſeveral plants raiſed for uſe in fields, and heretofore deſcribed; informing him of the nature and office of their ſeveral parts. This muſt not be eſteemed a matter of uſeleſs nicety: we are to give the ſame account now of the flower of the ſaffron, and without ſo much inſight as the farmer has by means of the former deſcriptions, in the nature of the ſeveral parts of flowers, it would not be eaſy to acquaint him what the ſubſtance we call ſaffron, which ſells at ſo great a price, and for the ſake of which the plant is cultivated, truly and properly is.

The flower of the ſaffron plant ſtands in a kind of huſk, formed of one dry piece. The flower itſelf is formed of one leaf, which at the bottom has the ſhape of a tube, but in the body is divided into ſix large oval parts, equal in ſize, and forming a kind of hollow veſſel; within this hollow riſe three filaments, theſe are ſhorter than the flower itſelf, and have each a duſty button at the top, of the ſhape of an arrow head. In the center of theſe, and of the flower, grows the rudiment of the ſeed veſſel: this is of a roundiſh form. On the top of it ſtands one filament, which is of the length of the three juſt deſcribed, but inſtead of a ſingle button on the top, this has there three large blades, which are rumpled and notched along the edges. Theſe are the ſaffron. Some have ſaid ſaffron is the filaments of the flower, but that is an erroneous expreſſion; the filaments are properly thoſe three threads which riſe from the bottom, and ſupport the buttons, in which is contained the duſt for impregnating the young fruit; but theſe three blades are diſtinct from them in ſhape, nature, and office. They grow from the top of that ſingle thread which riſes from the fruit, and their buſineſs is to receive the duſt from thoſe buttons of the filaments, and to convey it to that thread through which it is to reach the body of the fruit, and penetrating into its ſeveral cells, to impregnate the ſeeds. The twiſted, curled, and notched form of theſe three blades renders them very fit for the purpoſe of ſtopping this fine duſt, as it is ſhed on the burſting of the buttons of the filaments. The farmer's care reaches no farther than to the ripening of thoſe three blades: the time when theſe are in perfection is the period for gathering; and that is juſt before the buttons of the filaments burſt to diſcharge their duſt.

Saffron is a native of many parts of Europe, but not of England, though it lives ſo happily with us by culture; that the Engliſh ſaffron is allowed to be the fineſt in the world: and we are ſuppoſed, from the excellence of that article, to be able to make the famous Venice treacle, in as great perfection here, as they can in Italy. They have the advantage over us in the vipers, which are one ingredient, and are more full of virtue as well as of poiſon in the hotter countries, but we have as much the preference in ſaffron.

The Alps and Pyrenæan mountains are the places where ſaffron is moſt frequent wild; we have a plant not unlike it wild on the ſides of ſome of our Welch mountains. Dr. Dillenius has given a figure of it, in his edition of Ray's Synopſis of the Engliſh plants, but it is not the ſame with the true ſaffron: its flower, which is of the ſize of that of wood ſorrel, grows on a ſtalk a ſtalk whereon are ſeveral ſhort leaves, this ſhews it to be eſſentially different. All plants thrive better on being removed from a poorer to a richer land. This is the caſe with ſaffron; for when brought from the bleak and barren mountains of other parts of Europe, to the rich and ſheltered plains of Britain, it out-grows by may degrees its natural condition.

CHAP. LXIX.

Of the proper ſoil for ſaffron.

SAFFRON is cultivated but in few places. Some parts of Eſſex, and the neighbourhood of a town thence called Saffron Walden, in Cambridgeſhire, are in a manner the only ſpots of this fertile iſland, where it is raiſed. An attempt was made not long ſince in Surry, but without ſucceſs: on enquiring of Mr. James Ogilvie, who was a principal proprietor, I found the ignorance of thoſe who undertook the work, was the cauſe of the miſcarriage. Saffron is a nice article, but with due care it is leſs hazardous than many others. It delights in a warm flat ſituation, but will thrive better in open fields than incloſures. The fences uſed about it are to be conſtructed accordingly.

The proper ſoil is a rich light earth, improved by manures; it may eaſily be too wet or too rank, but it cannot be too much enriched by mellow dung, or too much prepared by tillage. A very rich loam is a good natural ſoil; or a mellow earth in which there is ſome quantity of ſand: for that ſoil alone is too often damp; and this is a fault of the worſt kind, as it will rot the roots. Care ſhould be taken alſo to examine the bottom, for a leſs proper ſoil, with a good bottom, will favour the growth more than a better, with what is bad underneath.

For the culture of liquorice there is required a great depth of good mould, and a hard gravel is the beſt bottom: for ſaffron this depth is not needful; but the nature of the bottom is of great conſequence. A hard gravel is beſt; and the worſt of all others is clay. If it happen that this lie under a deep ſoil it is very prejudicial, but if it be covered only with a thin coat of good earth, though that coat would be ſufficient otherwiſe, yet with the clay bottom it will by no means anſwer. The reaſon of this is, that clay bottoms hold water, which is prejudicial to ſaffron. Next to a gravel bottom, chalk is the moſt favourable, this is the bed that lies under the ſoil in many places about Saffron Walden.

CHAP. LXX.

Of preparing the ground for ſaffron.

SAFFRON requires to have the ground prepared at ſome expence. Indeed the richeſt crops in general demand the greateſt preparation. Open fields do better for it than encloſed countries. In thoſe places, the beſt method is to take a piece of ground that has been fallowed, and that has had a crop that has not greatly exhauſted it before. No growth exhauſts land leſs than barley; wherefore, let the farmer prefer ſuch land to any other.

The ſaffron is to be planted in the beginning of July, but the preparation of the ground muſt be begun in March. Toward the end of that month let him begin by plowing, and that in a particular manner. The ground muſt be plowed deep, and the furrows drawn very cloſe to one another. This brings all the parts of the ſoil together, and gets them all quickly into a perfect and good tillage. When the ſoil is thus broken, it is to lie ſix weeks to enjoy the benefit of the dews, rains, ſun, and air; and after this is the time of laying on manure. This muſt be well rotted dung, if it were freſh, it would not mix with the ſoil; and it would be too rank for this tender growth. The dung and ſoil will readily mix together; and it muſt be the farmer's chief care, that one parcel of the ground have no more dung than another. The quantity of dung is five and twenty load to an acre. The labourers muſt ſpread it equally over the ground, and it is then to be plowed: this anſwers the purpoſe of the ſpade in gardening.

In this condition the ground is to lie till the third week in June. And the laſt preparation for the root is then to be made by plowing again in this manner. The whole is to be carefully turned and made fine, and between every breadth of a pole, that is ſixteen feet and a half, there is to be left a broad trench. This ſerves to divide the lands, and for a place to throw the weeds. The ground is thus laid out for the crop, and nothing remains but to defend it from cattle. Hedges are not required, becauſe a ſlighter fence will ſerve; and the ſaffron will thrive the better for not being ſheltered. The beſt fence is a range of hurdles; or a ſlight dead hedge; it muſt be tight at the bottom, for hares are fond of eating the ſaffron.

CHAP. LXXI.

Of the choice of roots for planting.

SAFFRON roots are always to be had in abundance, for it encreaſes greatly. Once in three years every planter takes up his roots, and an acre yields him from twenty to thirty quarters of clean ones. Theſe are ſold by the buſhel. The owner picks out the beſt before he ſells any to his neighbours, and it is the buſineſs of the purchaſer to get after this as good as he can.

The firſt article is ſoundneſs. Some ſell them as they are picked up out of the ground; but this is a ſlovenly and careleſs method often injurious to the owner, and always hazardous to the purchaſer. We ſhall adviſe our planter to have his roots picked and cleaned for himſelf; and to purchaſe of ſuch as have uſed the ſame method. If he cannot get ſuch, he muſt take them as they run, but they ought to come ſo much the cheaper; and he muſt pick and clean them, before he commits them to the ground. We would have him proceed with certainty, and there can be none where many of the roots may fail.

Roots ought to come much cheaper when bought rough, not only becauſe many may be bad, but there will be a great deal of dirt, waſte matter, and old ſkins that fill up the meaſure. However, if the price be proportioned to the condition, and care taken afterwards in examining and cleaning them; ſometimes it may prove the beſt purchaſe, for the careleſs owner may thus ſell his beſt roots, and the new planter may get ſuch as he could not have bought otherwiſe. The roots of ſaffron are judged of by their ſize, weight and ſhape. The largeſt and heavieſt are beſt: let the buyer avoid little light ſkinny roots; and when he looks over his purchaſe, let him throw out the lighteſt; for it is better to loſe them, than to be diſappointed by depending on them. Thoſe are beſt which when picked have the ſmootheſt and brighteſt coat. After this let him preſs ſome of them gently between his finger and thumb, and break others. In preſſing they ſhould be found firm and ſpringy, for when flabby, they are in a condition of decay: when broken, they ſhould be full of a rich freſh juice.

There is a great deal in the ſhape of the roots. The large and fine roots are all rounded or flatted, and the ſmall ones ſhould be in ſome degree of the ſame form. They never can be ſo plump, ſo round, or ſo regularly ſhaped as thoſe full grown ones, but the more like them the better. Many are long and run to a point. The people in the ſaffron counties diſtinguiſh them by the name of ſpiggots; and always reject them. The intereſt of the farmer is, that his plants flower the firſt year, and the pointed roots never do ſo. The others often will flower when very ſmall: ſo that the planter need not reject a very ſmall root, provided it be of a right ſhape, and freſh, plump, and thriving.

CHAP. LXXII.

Of planting the ſaffron.

WHEN ſaffron roots were more ſcarce, the planters uſed to ſet them at conſiderable diſtances; but this is not eſſential to ſuch a ſlight bulb. This being now underſtood, and the roots plentiful enough, they are planted ſo near that about four hundred thouſand are required for an acre. Sixteen quarters contain about four hundred thouſand, and this is the moſt profitable quantity to plant.

The farmer may make the trial with a ſingle acre. If he chuſe to keep more land in this growth afterwards, three acre-pieces are the moſt proper, for they are eaſieſt managed. The inſtrument uſed for planting is a ſpade made narrower than the common kind, and ſlighter; with a clean blade and a ſharp edge. This they call a ſpit, or a ſpit ſhovel. To every man who has his ſpit ſhovel for opening the ground, there are to be two women with roots in their aprons. The man goes firſt, and with his ſpit raiſes three or four inches of earth, and throws it about half a foot before him. The women follow, and dexterouſly taking the roots one by one out of their aprons, place them in the fartheſt edge of the trench, which he makes in the manner already mentioned. The diſtance of the roots in the row is three inches: cuſtom will lead the women to do this very equally.

When one row is laid in, the ſpitter prepares for another, and at the ſame time covers theſe. He works croſſwiſe of the ridge, and when he has thus gone once a-croſs it, and the roots are in, he begins from the edge where he is, and works back again. He makes a new trench as the firſt, and the earth he throws up he turns in over the row juſt planted. All the care is, that he begin his trench at ſuch diſtance from the edge of the laſt, that it may be as far from the roots to be planted in the new one to thoſe in the other, as it is from one to another of thoſe roots in the row: for the meaning of his work is, that there be an edge of a trench left by his ſecond courſe a-croſs the ridge, juſt three inches diſtant from the firſt planted row. As he turns the earth of this trench over the roots of the other, he will leave the edge that is to be planted juſt in a way to be covered in by the earth of the next trench, and ſo on. This is what he is to do at every return, croſſing the ridge at every three inches till the whole be finiſhed.

The women follow him as in the firſt, and leave the roots planted, but naked, for him to cover; the next trench affords the mould for covering them; and when the ſpitter has gone through one ridge he begins upon another. When he has done, all lies even, and the ground is planted with roots three inches diſtant every way. His care muſt be to cut exactly and evenly to the true depth, and by that means to leave a level, ſound, and undiſturbed bottom for the roots to ſtand upon. If there be any haggling it will hurt their growth; and as he knows on which edge the roots are to be placed, let him be careful to keep the bottom particularly even there. A good workman will have a bottom as even as if it had been flatted by art.

The ſetters muſt place the roots directly and evenly upon their bottom. The great care in the art of planting lies there, and if once ſo placed, the earth that is ſo light in itſelf, and falls ſo lightly over them, will not diſturb them. When things are done in haſte, they are ſeldom done with care. The planters in the ſaffron countries are very ready and expeditious, but the eye of the owner ſhould be upon them to ſee they do all properly.

CHAP. LXXIII.

Of managing ſaffron while in the ground.

THE roots being got into the ground in the beginning of July, the planter has no occaſion to think of them for two months. They are to be left to nature; gradually to ſwell, and to open thoſe pores at which they are to take in nouriſhment, to ſhoot ſome fibres, and to receive the juices of the earth. In the beginning of September the ground may be cleaned, and broke on the ſurface. This will aſſiſt the puſhing of the ſhoot; but if it be done too ſoon, the earth that by its lightneſs would have aſſiſted in the forming and ſending up the ſhoot will too ſoon grow ſad again; and if the operation be deferred till the ſhoot is got to ſome length in the ground, though it does not appear above it; the inſtrument will cut them off.

In the beginning of September let the planter examine the ſtate of the roots by opening the ground. Let him take up two or three in different places, and he will ſoon ſee whether they be in a condition for the operation. He muſt make the trial in different parts of the ground, becauſe from particular accidents; if he made his trial only in one place, he might be deceived in judging from that of the whole field. The exact condition of the roots for this operation, is when they have made their ſhoot upwards, and it looks freſh, juicy and white, and has its point within an inch and a half of the ſurface. This is the exact time. It will be out of the way of the inſtruments; and yet ſo near the ſurface, that the dews and rains will enrich and feed it ſo richly, and a few days more bring it all over the field up above the ſurface of the ground.

The operation to be performed is a careful handhoeing: The hoes ſhould be of the uſual breadth, but a little ſtronger. Caution muſt be given the hoers to tread lightly, and cut carefully. Their buſineſs is to cut an inch or leſs into the ground, deſtroying all weeds, and looſening the ſurface. The hoers are to be followed by rakers, who muſt have the ſame caution of treading lightly; and muſt rake off the weeds cut up by the hoers, into the deep furrow or trench made at the edge of each land. The rakers level the ſurface, ſo that when this is over, the whole field looks again like a garden; with the borders new dug up. If there come gentle ſhowers, the owner may account himſelf happy. His field will remain but a little while naked; and he will ſee the fruit of his induſtry, in a regular healthful crop.

CHAP. LXXIV.

Of the gathering of ſaffron.

THE huſbandman will underſtand the reaſon of our caution, not to wound the top of the ſhoot, when he ſhall be informed that this is the rudiment of the flower itſelf. An injury to it would be irrecoverable. The practice of hoeing is the more eſſential, becauſe there is nothing to receive the nouriſhment it ſupplies but the flower, and no part of the flower ſhews ſo plainly the effect of a ſupply, as thoſe three blades which are the ſubſtance called ſaffron. They will ſhew themſelves in the flower, however poor the plant may be; but they will be thin and light in poor ground, and they will grow fat, thick, and rich, in proportion as the ſoil is better, or more improved by art. Therefore taking all means to ſupply the roots with nouriſhment in the beginning of September, when they are riſing to flower, is of all things the moſt eſſential in the management of ſaffron; not only the weight, that is, the quantity of the produce, depends upon this fatneſs of theſe blades, but its virtue, and its good appearance in the cake. The price of ſaffron, as well as the quantity, depend upon this article.

A few days after this hoeing will ſhew the young ſhoots of the crop, and that their regularity will make a very pretty appearance; a little time more will ſhew theſe ſpires all opening into flowers, and then the proſpect is agreeable indeed. The ſaffron plant is one of the flowers called crocus's; and is inferior to few of them in beauty. The field is, according to our method, planted with all the regularity of a garden; there is not left the leaf of a ſingle weed by the hoers and the rakers; and the flowers now open in all their glory. A ſight pleaſing in the greateſt degree to the owner, who with the beauty ſees the advantage. As ſoon as the flowers are open they are to be gathered, and the threads are to be picked out and ſeparated. This is a buſineſs that may be performed at home; therefore 'tis not neceſſary to attempt it in the field. The whole flower is to be gathered there, and the reſt to be done afterwards. The ſun and air have a great effect upon the flowers, and even upon the leaves of plants; we ſee them firm and plump in a morning, when they are full of the refreſhment of the dew; at noon, if the ſun have had power, they flag and grow lank; and toward evening they begin to recover their look of health and vigour again.

This natural change affects nothing more than this plant; and no part of this ſo much as the blades within the flower. Theſe are plump in the morning; they grow thin by noon, and they do but indifferently recruit themſelves in the evening, the completion of this is reſerved to the dews of the night: therefore early morning is the only time in which they are perfectly fine. The planter muſt ſend in a proper number of hands at day-break as ſoon as the flowers of the ſaffron appear, and theſe muſt gather till about nine in the morning. All the flowers of ſaffron in a field, do not appear together: little accidents occaſion ſome plants in the ſame field to be earlier, and ſome later in flowering. This is a great advantage: it would be impoſſible, if they all burſt forth together, that they could be gathered properly: but theſe accidents protract the time ſeveral days; ſo that the flowers of one morning being gathered, there is a freſh ſupply open for the next.

There is no exact degree of opening, at which theſe flowers muſt be gathered. The ſaffron is beſt in thoſe which are juſt ſeparated at the tops, or are juſt opening into the full bloom, but they may be gathered before or a little after this period. Thoſe flowers which diſtinguiſh themſelves by their full colour, whether they are fading or not quite opened, are to be gathered. Each of the gatherers muſt have his baſket on his arm, and no other preparation is neceſſary. Drunken labourers are at all times to be avoided, but they are to be moſt dreaded on this. There is danger, that in gathering ſuch a part of the ſaffron as is fit, more may be trodden down. The want of light, and the careleſſneſs of the gatherers, are the two things to be feared. This work falls out at a time when people are ſober, if they ever be ſo; but there are ſuch thorough ſots that they ſhould be examined. Though they are ready at day-break

they

they muſt not be ſent into the ground till it is well light: they are then to be poſted in different ſpots; to gather all the ripe flowers about them.

As theſe people pick up the flowers one by one, they are to drop them lightly into their baſkets. All the art of gathering is, that they lay hold on the lower part. The flower comes off more entire when taken by this part; and not touching it near the top, the uſeful blades which grow in the upper part, are not injured by the preſſure. Toward nine, or half an hour after nine, the gatherers ſhould deſiſt. The great care is to adapt the number to the work. If they be too few they muſt ſtay till they have done, even if it keep them within an hour of noon; but as there is a loſs to the ſaffron in this, the planter ſhould take care to ſend in a larger number next day. The next morning all are to be ready at the ſame hour, and the gathering is to be performed in the ſame manner. This is to be continued regularly till the whole quantity of ſaffron has flowered, and all its produce has been regularly collected.

CHAP. LXXV.

Of the picking the ſaffron out of the flowers.

EVERY morning there will be a quantity of flowers brought into the houſe. The baſkets of the gatherers, which have been lightly filled, are to be as lightly emptied, that no injury may be done to thoſe three blades, which are the eſſential part. The entire flowers are to be ſcattered over a large table, round which ſeveral perſons can ſit to pick: four forms are the beſt convenience for that purpoſe, and every picker ſhould be allowed free room for his arms. The ſame people who were employed in the morning as gatherers, may be ſet to work, during the reſt of the day, in picking: he is an ill manager, who does not contrive to have all the ſaffron gathered in the morning, picked during the day.

The method of picking is to take the flower by the bottom, between the thumb and two fore fingers of the left hand, and laying hold of the ſtring that riſes from the embryo of the fruit, juſt below where the blades of ſaffron grow from it, between the thumb and fore finger nail, to nip it off there; this part is to be laid by, and the reſt of the flower thrown away. From time to time a ſweeper ſhould clear away about the pickers feet, taking off the flowers they have thrown down; and every picker ſhould have his or her own diſh, that the owner may ſee each does his part in the buſineſs, and that all do it right. I have ſeen great irregularity when ſeveral people picked into one diſh, one laying the fault, when diſcovered, upon

another;

another; but when each works ſeparate, though all are at the ſame table, the ſenſe that he is to anſwer for what he does, will keep him diligent.

The part to be picked out, being the three blades of each flower, there may be faults on either ſide. That of careleſſneſs in ſervants is moſt frequent, they not taking out the whole of theſe blades; and on the other hand, the avarice of the maſter makes him ſometimes inſiſt on their taking out more, nipping off a piece of the filament to which they grow, along with them, by laying hold of it too low. The firſt defrauds him of a part of his quantity, the other debaſes the value of the ſaffron. To prevent injury from the firſt, the owner muſt have his eye upon the work; and ſometimes look into the picked ſaffron in the diſhes, and ſometimes into the flowers thrown down upon the floor. There is a certain way of knowing when the work is rightly performed: this is by obſerving the bottoms of the blades. The deſign is, that theſe be all nipped away together, by pinching off the top of the filament juſt below where they are inſerted. If the three blades do not hold together, they have been taken off too high, and he has loſt a part of his ſaffron: if they have been taken off too low, he will ſee a long ſtring to which they grow, hanging from their baſe; by which he knows he has more than he ſhould, to the damaging, in ſome degree, the beauty of his ſaffron. The injury this way is not very great, for the colour of the filament, though fainter, is not diſtinguiſhed eaſily, when it has been preſſed and made up in the cake; but the buyers of this commodity are now ſo good judges, that the planter cannot be too careful.

The pickers ſhould have long and ſharp nails on the fore finger and thumb of the right hand, otherwiſe they pinch the ſaffron off in an aukward bungling manner, always cruſhing the filament to which the blades grow, and too often the blades themſelves. The people who expect to be employed on this ſervice, in the ſaffron countries, know the uſe of preſerving theſe nails long and in good order; and they commonly do it at the ſeaſon: but as every little article in this is of conſequence, the owner will do well, eſpecially when he ſhall propagate ſaffron in a county where the labouring people are not uſed to it, to beſpeak his gatherers and pickers in time, and caution them to let theſe nails grow for the ſervice: it will anſwer their purpoſe as well as his, for they will go through their work with more eaſe, by being thus provided againſt the time, with this natural implement. Let the owner look carefully into the flowers they throw down. If he ſee the filament left at its whole length, or very nearly ſo, and its end pinched off clean and ſharp without bruiſing, he need not look into the diſh of that picker to ſee his ſaffron : 'tis certain from this, that the valuable part is taken out clean, entire, and well. If he find parts of the three blades remaining on the top of the filament in ſome of the flowers, and a great deal of the filament nipped away in others, he will know, that in the one caſe he is defrauded of a part of his produce, and in the other, that he has a diſadvantageous addition. This careful inſpection will keep the people at their duty, and make thoſe honeſt through fear, who would not be ſo in principle. None but he who has obſerved it, can conceive the difference there is between ſervants who work under the eye of a careful maſter, and thoſe who are in the pay of a negligent perſon, who leaves them to themſelves.

CHAP. LXXVI.

Of the drying of ſaffron.

THE manner of picking ſaffron for one day, is applicable to every day. The people are ſent out to gather the flowers riſen in the morning, they unload themſelves two hours before noon, and are employed in picking out the ſaffron during the remainder of the day. Thus they are to proceed till the whole crop be gathered, and the whole quantity of the blades picked out. This is the ſaffron, we left it in their ſeveral diſhes, ſeparated as clean, and kept as pure as the nice eye of the owner could obtain it, and we are now to inform him in what manner it is to be prepared for ſale. Theſe blades of ſaffron would ſoon dry if left to themſelves : this would rob them of a part of their virtue; and of a great deal of their weight. The owner is to ſell them by weight, and will have a price proportioned to their condition. The method of preparing is by preſſing them together into large cakes, with the aſſiſtance of a ſlight degree of heat. This forms them into compact maſſes, which remain long in a damp or ſoft condition, retaining the full flavour and colour they had while in the flower. It is thus the druggiſt or dealer expects to buy them ; and he will always give a price proportioned to the degree of perfection with which this work has been performed. All that regards the management of ſaffron is nice, but this is the moſt nice of all. Some heat is abſolutely needful, but ever ſo little beyond the due degree is hurtful; and a little careleſſneſs in the management may burn the ſaffron, after which no art can bring it to be worth any thing.

The drying of ſaffron is effected by means of a kiln, but this is of eaſy ſtructure, and ſmall. We have ſaid extream care is neceſſary, very little beſide care is neceſſary ; therefore let not the owner, who reaſonably expects ſo large a profit, ſpare that. The kiln ſhould not be erected in a fixed manner, becauſe it will be convenient to move it from place to place; and the degree of fire to be uſed is ſo moderate, that there is no need of hard or heavy materials.

Let the huſbandman provide a large, broad, and thick plank. Let him ſupport this upon four ſtrong legs, that it may ſtand firm, but not fix theſe to the floor, nor the plank to the wall: let it be as a moveable table, that he may carry it any where, as he ſhall have convenience or occaſion. The legs are to be ſhort, and ſo contrived that they may ſtand very ſteady. The outſide of the kiln is to be made of eight pieces of ſound wood, about three inches thick, in form of a frame upon the plank. This frame is to grow gradually wider, all the way from the bottom to the top, which is to be done by ſetting the pieces ſloping. Its beſt breadth at the bottom is a foot; and it ſhould be near twice that at the top. The height ſhould be about equal to the width at the top. Two and twenty inches high, and two and twenty inches broad at the top, and twelve inches at the bottom, is the uſual dimenſion of the kiln for ſaffron in Cambridgeſhire; and this ſize and proportion is ſo convenient, that it would be idle to think of making any innovation. On the foreſide of this frame there is to be a hole eight inches wide, and about four inches above the ſurface of the plank. The uſe of this is to introduce the fire. And over all the reſt there is to be a covering of laths, of the beſt and evenneſt kind that can be procured; and care is to be taken to lay them regularly, evenly, and pretty cloſe together; they are to be nailed to the frame, and then they are to be plaiſtered over on both ſides. The planks are alſo to be covered very thick at the bottom with the ſame plaiſter, which when dry makes a kind of hearth and ſides for the reception of the fire. A hair cloth is to be ſtretched over the top or wideſt part, which is what they call the mouth of the kiln: this is to be fixed to the ſides of the frame, and alſo to two rollers, or moveable pieces of wood, which are turned by a kind of wedges, and ſerve to ſtrain and tighten the hair cloth on occaſion.

When the kiln is thus far prepared, let the huſbandman lay in readineſs a couple of ſmooth and thick boards, a little larger in length and breadth than the top of the kiln; and with theſe a clean thick blanket, and a quire of white paper. Let a quantity of ſmall and fine charcoal be ſet by the kiln, to make and keep up the fire. This muſt be clean and free from knots, and in this choice of it a great deal of danger is avoided. The plaiſtered bottom and ſides of the kiln will very well bear the due quantity of fire for this purpoſe, nor will they be injured, whatever be the condition of the charcoal: but this is not the caſe with the ſaffron; that requires not only a very gentle, but a very equal heat: it is eaſily damaged; and no fuel will keep up ſo equal and quiet a heat as fine even grained charcoal. Such as is knotty, and of the nature of what they call in London *old coal*, is fiercer, but that quality is not wanted on this occaſion: it burns irregularly, the knots being always leſs charred, by reaſon of their hardneſs, than the intermediate parts. The fire, with the ſame fuel, is ſtronger at ſome moments and weaker at others, which will affect the ſaffron irregularly, and the knotty part often crack and fly, the ſparks from which will be apt to burn the hair cloth, and do other damage.

Every thing being in readineſs, let ſome charcoal be lighted, to put into the kiln: then let half a dozen ſheets of paper be evenly laid upon the hair cloth: upon theſe let the picked ſaffron be laid three inches thick, and ſpread very regularly, juſt as it comes from the pickers hands, and without any preſſing; that is to come afterwards, when the ſaffron is more in a condition to bear it, and is to form it into thoſe thin and compact cakes in which we ſee it. When the ſaffron is thus ſpread to a proper thickneſs upon the papers, more ſheets of the ſame paper are to be ſpread over it; and then the blanket is to be folded and doubled, ſo as to bring it to a little more than the ſize of the top of the kiln. This blanket is to be laid upon the upper range of papers, and the fire is to be then put into the kiln. A few pieces of ready lighted charcoal are firſt to be put in at the ſquare hole in the front, and upon and about theſe are to be laid more pieces, all of them ſmall: for large pieces burn unequally, ſo that it is never poſſible to keep the fire at any regular ſtandard.

Chemiſts know this article of keeping up a regular fire by ſmall charcoal perfectly, and all others ſhould learn of them on this occaſion. When they have nice operations, they firſt break their picked charcoal into pieces of the bigneſs of a wallnut. And this is the proper method of acting in this article of drying the ſaffron. The quantity of fire muſt be proportioned to the quantity of ſaffron. 'Tis impoſſible to convey any notion of this in words; all the terms on this occaſion being compriſed in two, great and little. The fire muſt be of the latter kind, but yet it muſt be enough to affect the ſaffron; the beſt method of acquainting the unexperienced, is to tell him what is the deſign of it. The thing to be done is not the drying the ſaffron at once, for that would utterly ſpoil it; but to give it ſuch a degree of heat at firſt, as will diſpoſe it to grow damp. This is a certain conſequence of its being warmed and covered up, and this is what the people in the ſaffron countries call ſweating of it. This is the degree of heat required, and hence the owner will judge what is to be the ſtrength of the fire. He will find, by the condition of the whole, whether it be right. The firſt hour is the moſt critical of all the time of drying. The fire is required to be ſtronger than at any other time, though then but moderate. What is called ſweating of ſaffron, is raiſing ſome moiſture out of the blades, by a gentle heat, which being detained by the covering of the paper and the blanket, is returned upon the ſaffron again, and there works by ſoftening and mellowing the blades; ſo that they are, after a time, diſpoſed to unite by a gentle preſſure, and to form together one compact cake.

When there has been ſuch a fire as ſerves properly, continued for half an hour, the board we have directed to be in readineſs is to be laid over the folded blanket, and a large weight is to be laid upon this. The mellow and ſoft matter is thus preſſed by degrees; and preſently, from a body of three inches thick, as it was at firſt, is reduced to an inch in thickneſs. The fire is then to be a little leſſened. The heat and preſſure now operate together, and the cake continually becomes thinner and more compact, and is kept in a condition of moiſture wherein it blends perfectly in all its parts; ſo that it advances by degrees, toward the condition wherein it is to be finally made up. When this degree of heat has been kept up an hour, the huſbandman is to turn the cake of ſaffron. This he is to do in the following manner. The blanket and board, with its weight, are all to be taken off; and the papers are then to be raiſed up, looſening the ſaffron where it ſticks to them: then the papers are to be laid on again, covering the cake as before, and then a thin board is to be thruſt in between the hair cloth of the kiln, and the lower parcels of papers: theſe are what were firſt ſpread upon the hair cloth, and they now lie cloſe under the ſaffron. When a board is compleatly got under theſe papers, the cake of ſaffron lies upon it, and may be eaſily turned. This is to be done carefully, and the whole, with the new ſpread upper papers, is to be laid again evenly upon the hair cloth of the kiln. When that is done the board which ſerved for turning it is to be taken away, and the blanket, doubled as before, is to be laid over it; the board for preſſure is to be laid upon that, and the weight put upon it.

Every thing is now in the ſame condition as at firſt, except that the cake is turned, and the ſame degree of heat is to be preſerved in the kiln, that there was the laſt half hour, which is ſomething gentler than the firſt. In this manner the cake is to lie one hour: at the end of that time the weight, board, and blanket are to be taken off, and the cake is to be raiſed, freed from the papers, and examined. If there be no miſchief done now, the danger is over, for theſe two firſt hours have all the hazard; for the reſt of the time, leſs heat is needful, and all the care neceſſary is frequent turning. We will ſuppoſe the cake of ſaffron well managed, and to have paſſed through the operation of the two firſt hours. It is then to be turned and laid on again, and a gentle heat kept up. This heat muſt be preſerved as equally as can be for two and twenty hours, and the ſaffron muſt be turned every half hour during that time: when this is over, it is in the right form, and is fit for ſale. It is to be wrapped up in a bladder, oiled on the outſide, and that is to be again wrapped up in leather, and then the whole in flannel. This care keeps it in the due condition, till required by the purchaſer, it remaining moiſt and tough, without the loſs of colour, taſte, weight, or virtue. This is ſufficient, if there be a ready market upon the ſpot; but if the owner be obliged to keep it ſome time, the proper ſecurity is to put the whole parcel thus wrapped up and covered, into a leaden or tin box: in that way it will keep years.

CHAP. LXXVII.

Of managing the latter gatherings of ſaffron.

THE huſbandman is to ſend gatherers every morning, ſo long as any number of flowers appear upon the field; and according to various accidents, there will be ſome plants forwarder and ſome later than the generality of the reſt, by ſeveral days. On this depends a diſtinction between the better and a worſe kind of ſaffron. Thoſe flowers which open before the generality of the others, are finer than the reſt, for their forwardneſs is owing either to the ſtrength of the roots, or the particular richneſs of the ſpot. The fineneſs of theſe flowers conſiſts in the largeneſs and plumpneſs of the chives; and theſe may ſtand to be gathered with thoſe of the ſucceeding morning, if not enough to ſend for alone, becauſe thoſe rich blades will ſupport themſelves in good condition for ſome time after the flower is open. Theſe are the richeſt kind of ſaffron, and they are mixed with the reſt, giving a value to the whole.

On the other hand, there are quantities of the plants which ſtanding on poorer ſpots, or under ſhelter, or from the ſmallneſs of the roots, flower later than the generality. As the blades are in the more forward plants richer than the reſt, they are in theſe poorer, and it is not to the advantage of the owner to mix them with the reſt of his produce; becauſe theſe would diminiſh the price, more than their quantity would make amends. He is to look upon theſe late gatherings as a particular kind of ſaffron, inferior to the reſt, and conſequently to be made up ſeparately; but ſtill it is very well worth his care, the worſt ſaffron bringing a large price in proportion to any other produce. Let him make the gatherers take up every flower, and ſee all picked with the ſame care as the others. When the kiln is ready, he is to ſpread his papers over the hair cloth, and then lay on this ſaffron, to the thickneſs of four inches. When the ſaffron is ſpread, the next thing in the fine kinds is to cover it with other papers and the blanket; but in this a little ſmall beer muſt be ſprinkled in among it, from the end of a clean bruſh. The ſmall beer ſhould be clear and ſtale, and a bowl of it ſtanding by, the bruſh is to be dipped in, and when taken out and drained a little, the handle of it is to be ſtruck againſt a ſtick, held in the left hand, by which means the beer that is left among the hair will be ſcattered in very ſmall drops among the looſe ſaffron.

The fire is now to be put in, and it ſhould be rather leſs than is uſed for the fine ſaffron. The ſprinkling with the bruſh is to be repeated from time to time, till there be a good deal of beer got in and perfectly mixed, and till the effect of the heat begins to raiſe a little ſteam from it. At this time the upper papers are to be laid on, and the blanket upon them, and ſoon after the board and weight. Then the whole is to remain about five and forty minutes, when the board, blanket, and papers, are to be taken off, and it is to be turned as the other kind. The quantity of beer muſt be enough to moiſten the blades, without any running from them, and it will ſerve in the place of that natural moiſture they ſhould have: they will ſweat and ſoften, and blend together, like the fine ſaffron, which they would not have done otherwiſe for want of due moiſture. Many things have been tried, but none anſwers this purpoſe ſo well as ſmall beer. Some uſe water, but that ſubjects the cakes to mould: others have uſed white wine, but that draws away the colour of the ſaffron, and gives it to the papers; others have uſed ale, but that is too clammy: it is a very nice article, and of all things that have been tried, or perhaps ever can, there does not ſeem any that will anſwer ſo well as the old plain country practice of ſmall beer. This is a little ſtrengthened beyond water, and it has a little clammyneſs, theſe are enough, it will not grow mouldy; it does not rob the ſaffron of its colour, and it gives a toughneſs which is ſufficient.

The cake is to be dried, in the ſame manner as that of the finer ſaffron; but it is beſt to keep the fire throughout a little more gentle, and to let it lie ſix or ſeven and twenty hours.

CHAP. LXXVIII.

Of certain particularities in the preparing of ſaffron.

SOME have attempted to alter the kiln for drying ſaffron, and introduce new and particular methods for curing of the cakes, but by all I have ſeen they are worſe than the old way. The firſt improvement that was attempted, was to lay a net-work of fine iron wire acroſs the top of the kiln, inſtead of the hair cloth. This was ſaid to have great advantages, the principal was, that the ſaffron dried faſter, and with a ſmaller quantity of fuel. This is true, but we have ſhewn in many articles before, that there are ſavings, which are the greateſt loſſes. The fuel uſed in drying ſaffron, is too trifling to deſerve naming; and as to the article of time, what is the beſtowing a day and night upon a parcel of a commodity, the value of which is ſo great. The diſadvantage that attends this method, is more than the good by many degrees, the ſaffron is not enough defended from the abſolute force of the fire: it burns if there be not the moſt exact care taken, and often in ſpite of all the care that can be. The cake dries quicker, but that is a fault; for the great benefit of the caking, is the time it will keep moiſt and good in that condition, and that is the effect of the thorough ſoaking it gets in the ſlow drying.

A ſecond improvement is, the uſing linnen cloths inſtead of the papers laid over and under the ſaffron; there does appear a poſſibility of making an advantage of this, for the linnen falls cloſer, and preſſes more perfectly upon the ſaffron than the paper can; but we are not got at the compleat management. The cuſtom at preſent is to lay a parcel of papers upon the hair cloth, then to ſpread the linnen over them, and upon that to lay the ſaffron, which they cover with the other linnen, and then lay on the blanket; but there is an inconvenience in this, for the ſaffron dries too haſtily at top, and frequently has the marks of the cloth on both ſides, which hurt the ſmooth and rich appearance of it, and are not eaſily got off again.

This is not to be rejected, as the wire covering, but improved. The method I ſhould propoſe is this. Let him have a few ſheets of thin fine paper, ſuch as in London is ſold under the name of thin poſt, and ſome quires of the common cheap ſort beſide. I have found that for this common kind, what are called the outſide quires of printed demy, are the fitteſt, they are large and ſmooth, and not too compact. Theſe may be bought for about four-pence a quire, and if there be ſome imperfect ſheets among them the matter is not much. I would have the huſbandman ſet out with ſome quires of this, a few ſheets of the thin poſt, and a couple of pieces of middling fine cloth; each ſo large as, when doubled, to be of the ſize of the hair cloth. Let him alſo have his blanket and other matters in readineſs. Having ſtretched his hair cloth, let him lay upon it ſome ſheets of the demy paper, on theſe let him lay one of his cloths doubled; and when he has ſpread and ſtroaked this ſmooth, let him lay evenly upon it as much of the fine paper as will juſt cover it, cutting it into pieces for that purpoſe, ſo as to make an even bed for the ſaffron. On this let him lay his three or four inch thickneſs of ſaffron, as it is of a finer or an inferior kind, and then cover the ſaffron with another even bed of ſingle fine paper, and lay the ſecond double linnen cloth over that. Upon this let him lay on other ſheets of the demy paper, and then the blanket. This done let him proceed in the manner as already directed. He will thus have the advantage of the linnen, which is a real improvement without its inconveniencies, and will preſs his ſaffron into a fine cake, without the marks of the cloth.

A third variation in the management of ſaffron at the kiln, is the uſing a ſtuffed pillow inſtead of the blanket, for covering it. We name this under the title of a variation, becauſe it by no means deſerves the title of an improvement: for it has not one advantage over the other method, but is in every reſpect worſe. The pillow is made of canvas, and filled with ſtraw. We need ſay no more about a thing which we ſo utterly condemn.

CHAP. LXXIX.

Of the papers uſed in drying ſaffron.

WE mention an article dependent upon the ſaffron trade, in which the owner has an advantage, but in which the abuſes are ſo great, that, in point of honeſty, he ought to be upon his guard, to diſcountenance ſuch as practiſe them. Papers are, in the common way of drying, ſpread under, and over the ſaffron. Now the preſſure which connects the blades of ſaffron into a firm cake, cannot fail to diſlodge ſome of their juices: theſe are of a rich colour, and they ſtain the ſeveral papers, penetrating through them as they lie one over another. Theſe papers, eſpecially ſuch as have lain next the cake, are ſtrongly impregnated not only with the colour, but the cordial virtues of the ſaffron, their taſte manifeſts this; and they very readily communicate their colour and qualities to liquors poured on them.

The diſtillers make ſeveral cordial waters, uſquebaugh of the yellow kind, and the like, which the receipts order to be coloured with ſaffron, or more properly ſpeaking, they order ſaffron to be put into them for its cordial virtues: the diſtillers finding there were papers thus ſtrongly tinged with ſaffron, in the common way of curing that commodity, bought them up and coloured their liquors, ſaving the price of ſo dear an article as ſaffron. Had the abuſe ſtopped here the matter had not been very great, but the next ſtep was, that the apothecaries, or rather thoſe retailers in London, who call themſelves chymiſts, and very unhappily for the buyer, rob the apothecary of that part of his buſineſs, took theſe papers into their hands. Theſe perſons are ordered by their diſpenſatories, to make a ſyrup of ſaffron, by infuſing a large quantity of ſaffron in ſtrong white wine, and then melting the fineſt ſugar in it; but they pour a pint of boiling water upon a couple of ſheets of this paper, and ſweetning the ſtrained liquor with two pound of middling ſugar; they ſell this as ſyrup of ſaffron. They are ordered to make a tincture of ſaffron alſo, of the fineſt ſaffron infuſed in wine, or any ſtronger liquor; but for this purpoſe theſe people only dip ſome ſaffron papers in wine, or ſpirit, till the liquor is yellow enough, and this they ſell for tincture of ſaffron.

They uſe theſe papers alſo on many other occaſions, defrauding the ſick of that help the judgment of his phyſician would have given. The ſaffron trade is hurt by this; and that it would be their intereſt who raiſe it to join in a reſolution, that no ſaffron paper ſhould ever be ſold again. This can only be done by a joint reſolution to deſtroy all of them; and I am convinced that if they would have the ſpirit, they would find the price of ſaffron riſe in one year, ſo as to make them ample amends for what they would loſe in the ſale of the papers: the demand muſt be greater, and the trade would every way feel the benefit of it.

If this cannot be brought about, let me adviſe the owner, to avoid thoſe wicked artifices which are uſed by too many, to give more colour to the fainter papers. This is done with other ingredients, not with ſaffron. I ſhall not name them, leſt I give inſtructions for a practice againſt which I write: but certainly ſo much of this artifice is uſed at preſent, that the quantity of what are called ſaffron papers, uſed annually in London, is ſix times as much as all that are fairly produced in a year. This I mention as a farther caution to the ſaffron owners, for it is ſtriking at the very root of the trade. They are ſenſible that the demand is not what it uſed to be, and they may be aſſured this is the reaſon.

CHAP. LXXX.

Of the produce of a field of ſaffron.

THE firſt year affords the huſbandman but a moderate advantage in this article: nay, ſometimes the crop is ſcarce worth the charge of gathering, picking, and curing; but a field of ſaffron is planted for a three years continuance, and it is from the ſecond and third of theſe ſeaſons he is to expect that great advantage we have told him there is in raiſing this commodity. Nothing is more uncertain than the quantity that ſhall be produced the firſt year; ſometimes from a rood of the land there ſhall not be gathered above a pound or two of freſh blades, and ſometimes leſs: ſo that it will not pay charges; but from this to about ſeven pounds from the rood, is the moſt general produce: and at an average, where every thing has been rightly managed, and the ſeaſon moderate, the owner may expect about five pounds. This will yield about one pound of ſaffron when prepared, and ready for ſale.

This produce of the marketable ſaffron from the freſh blades, is to be reduced to great exactneſs. If proper care be uſed, the owner may expect one pound of ſaleable ſaffron from every five of the firſt gatherings, and about a ſixth part leſs from the pickings of the laſt flowers; thoſe who uſe ale have found, that leſs than five pounds of the poor blades will yield a pound, but this is owing to a part of the clammy moiſture of the ale being left in the cake, and the price is reduced more than the encreaſe of quantity compenſates. On the other hand, ſix pounds of the ſame freſh blades go to make a pound of pure ſaffron, in the way we have directed; and this is a proof the ſmall beer dries away, only ſerving to moiſten and ſweat the ſaffron, and leaving little behind in the cake. The time that a three acre field of ſaffron will continue flowering, is about four weeks. Three weeks of this yield the fine rich ſaffron, and the laſt week only yields the poorer blades, which require that artificial management we have named. The great profit ariſes from the two laſt crops: but the owner is not to underſtand, that the produce of thoſe two is equal. The ſecond yields a vaſt quantity in proportion of the firſt; and the third is the richeſt of all. The produce of ſaffron, taking in all the methods of advantage we have named, may be very moderately ſet down at four and twenty pounds of marketable ſaffron to the acre for the two laſt years, reckoned together. The firſt bears no proportion to theſe, but this is a vaſt profit.

CHAP. LXXXI.

Of the management of the ſaffron field the two ſucceeding years.

THE owner, who has gathered his firſt crop, has very little trouble or expence to come. The roots retain their full vigour, and the ground having been ſo thoroughly prepared, will ſupply them with nouriſhment without farther aſſiſtance; all he is to do is to deſtroy weeds, and to preſerve the roots from injuries. He muſt have the land hoed, and he muſt regard the ſeaſon for the firſt ſhooting of the roots for flowering. As to the latter article, he has no care upon his hands but to keep his fences good, that cattle, and particularly hares, be kept out, for they are very apt to infeſt the ſaffron fields in winter.

As to the gathering, picking, and preparing the ſaffron, it muſt be the ſame as at firſt, only as his crop will be much larger, he muſt employ a greater number of labourers; and as he has more at ſtake, he ſhould not grudge to be more careful, in the over-looking every part of the work. The ſaffronmen in ſome places turn in their cattle after the leaves are fallen, to feed upon the weeds that grow among them. But that practice runs counter to reaſon. Nothing is of more benefit to ſaffron than hoeing; this is to be performed at a moderate expence, and if repeated at proper times there will be none of this growth of weeds: and in the next place, if this have been omitted, and there be a growth that may ſerve the cattle a little, their feet will diſturb the roots, and harden the ſoil. Nothing can be more beneficial to any crop than breaking the ground while it is growing The ſuffering it to be trod down by cattle has a contrary effect.

The longer a crop is in the ground, the more it will ſtand in need of this operation; and the richer that crop is, the more it will deſerve it: now ſaffron is to ſtand three years, and is one of the richeſt crops a ground can bear; for theſe reaſons hoeing ought to be frequently repeated. The more compact the ground is, the leſs benefit it receives from the ſun, air, and rains. Therefore let the huſbandman frequently hoe his ſaffron fields, he will give a much larger ſhare of nouriſhment, and by deſtroying the weeds, he will make it all go to enrich the ſaffron. The more he hoes the ground the heavier the chives will be, that is, the more ſaffron he will have. The charge of hoeing frequently will coſt ſomething extraordinary, but he may be aſſured, he will gain two hundred per cent. upon all the money he ſhall expend in this manner: as there are few articles ſo profitable as ſaffron, there is ſcarce any in which there is room for more improvement.

CHAP. LXXXII.

Of breaking up a ſaffron ground.

SAFFRON is to ſtand three years. The plantation has then done its utmoſt, and he is to break up the ground. The profits would naturally make him unwilling to give up ſuch an article, but he is far from being under a neceſſity of doing it, he muſt take up his preſent plantation; but he is in a better way than ever to begin another. He is now in the condition of the perſon from whom he bought his roots, and as he will be able to ſupply others with ſuch as are to ſpare, he will know how to keep the beſt for himſelf. Whatever may have been his profits in his firſt three years, he may promiſe himſelf much greater in the following: becauſe he now ſets out with more knowledge, and will be at all the needful expence and care with more freedom and ſpirit. As he will therefore not fail to chuſe his ground properly, and dreſs it well, and will ſet out with ſuch a choice collection of roots as he never could have got by purchaſe, he may promiſe himſelf not only a much larger, but a much more certain and continual gain. He is now to ſet about the taking up and tranſplanting his roots, and either uſing all to enlarge his ſtock, or ſelecting what quantity of the beſt he pleaſes, and diſpoſing of the others as he at firſt bought them, to a certain advantage. If he chuſe to enlarge his plantations, let him firſt ſeparate his roots, the finer from the inferior, as if it were for ſale; and let him throw away the very worſt. When he has made this diviſion, let him plant his large and fine roots in one field, and his ſmaller and inferior for a new growth in another.

Let the farmer who is about to enlarge under this article, conſider his other circumſtances; let him ſee whether he muſt not neglect ſomething eſſential, to fall ſo largely into this particular; and finally, let him conſider the number of hands that are wanted, and where he ſhall find them. We do not mean to diſhearten him from enlarging his ſaffron grounds; but would have him ſet about it with diſcretion. The great profit may tempt him to exceed the bounds of caution, and for that reaſon we lay theſe hints before him, that if he find he cannot conſiſtently with his other neceſſary affairs, manage a larger crop than his former, he may content himſelf with the ſame quantity of ground, for that will now yield him a larger produce and require a larger number of hands in proportion: if he find he can have opportunities, and hands for a larger quantity, that he may proportion his undertaking, to the nature and convenience of his other affairs. Nothing would perplex him more than to have a larger plantation than he found at the ſeaſon he could manage. And nothing would be ſubject to greater loſs; for the gathering and curing of ſaffron is a thing that cannot be delayed when it is ripe.

The laſt gathering being over, and the ſaffron cured for ſale, let the field be carefully plowed up. The farmer muſt ſend in a careful and honeſt fellow for this ſervice, as well as a good plowman. He muſt be told, the depth at which the roots lie, and he muſt take care to cut beneath them that he do not injure them, and that he turn them all up. Twelve or more people are to be ſent in to follow the plow, and to pick up the roots: each is to have his baſket, to toſs the roots into as he gathers them from the ground; firſt giving them a gentle ſtroke againſt the outſide of the baſket, to ſtrike off what mould may happen to ſtick in lumps about them. When the plow has been through the ground, and the roots collected after it are brought in, the whole is to be harrowed twice over with a good well tined harrow. This will penetrate four or five inches into ſuch light land, and conſequently it will bring up all thoſe which the plow turned under the mould. The ſame people are to follow as they followed the plow, picking up every root they ſee. I have generally obſerved, that by that time the field has been twice harrowed, there is hardly a root left in it. Theſe roots are to be carried to the reſt, and all thrown together on a large floor, where people are to be ſet to pick and clean them. What is to be done is only to clean the roots from earth, from dead parts, and from old ſkins, or other foulneſs. This is the proper time alſo to ſeparate the fine from the others. The cleaners ſhould be told to throw them into two ſeparate parcels; the large into one heap, and the ſmaller and leaner into another. When the roots are cleaned, they will keep good ſome time; but the beſt method is to plant them out immediately.

The huſbandman knowing the time when his roots are to be taken up, he ſhould have a freſh piece of land well choſen, and thoroughly prepared. While his roots are picking, he ſhould give this the laſt plowing, and immediately after ſend in the ſpitters and ſetters; giving to the laſt his choiceſt and fineſt roots. This foundation laid for his great crop, let him with the ſame care plant the leſſer roots in his ſecond field. As there are certain variations in the manner of drying the ſaffron, ſo there are in the article of breaking up the ground. Some inſtead of plowing uſe a particular inſtrument called a pattock: this is a kind of forked hoe, or prong hoe, with ſharp and ſtrong points; but I altogether give the preference to plowing.

This inſtrument is very apt to wound the roots; it is manual labour, and therefore comes more expenſive; and it does not ſo perfectly clear the ground.

CHAP. LXXXIII.

Of ſaff-flower, or carthamus.

THIS is a plant leſs known than any other which comes under the cognizance of the farmer, nor is there any great matter to be ſaid in its recommendation: however, as it is cultivated in ſome few places in England, and very much in other parts of Europe; and as there may be circumſtances that may render it advantageous to the farmer, we ſhall give him an account of its nature and management.

Saff-flower, or carthamus, is cultivated for the flower, and probably the culture of ſaffron gave riſe to this article, for its flower is uſed to ſome of the ſame purpoſes, and it is called for that reaſon baſtard ſaffron. The plant is a kind of thiſtle, and has very much the appearance of a weed. It is an annual. The ſtalk is robuſt, and four foot high. The leaves are large, not divided or indented, but beſet with prickles at the edges: the flowers grow at the tops of the branches, and are a kind of large ſcaly heads, reſembling thoſe of our thiſtles, with a great quantity of threads iſſuing out at their tops. Theſe threads are of a bright and beautiful yellow, and have been ſuppoſed by ſome to reſemble the blades in the flower of ſaffron; but there is not much likeneſs: it is for the ſake of theſe the plant is cultivated principally, though the ſeeds are alſo an article in trade. The flowers are contained in a large common cup: it is of an oval form, and compoſed of ſcales placed like tiles one over another, and they have each the addition of a little leaf of an oval form. The whole tuft is compoſed of tubular flowers, each is formed of a ſingle leaf, and has the hollow narroweſt at the baſe, and wider all the way to the mouth, where it is divided into five little ſegments.

In this flower riſe five ſhort filaments, and at the tops of them ſtand ſo many buttons, which are of a cylindrick form and oblong. In the baſe of the flower is depoſited the rudiment of the ſeed: this is very ſmall and ſhort: from its top there riſes a kind of filament longer than the others. This is the part to which the three blades grow in the flower of the right ſaffron; but in this it is terminated only by a plain little head, which ſerves to receive the duſt from the buttons of the ſhort filaments. When the whole flower is faded, the ſcaly head remains, and contains the ſeeds.

Several ſpecies have been added to this, one with blue flowers, and others with divided leaves; but the true and proper plant to be raiſed for uſe, is that here deſcribed. It is a native of Egypt, and is cultivated in the warmer parts of Europe. The principal place where we have ſeen it in England, is in Norfolk; but, if worth while, it may be raiſed in any other part of the kingdom.

Let the farmer have the ſeeds from abroad; and as often as he ſows it let him get freſh, for they do not ripen well in England. Theſe may be had at a ſmall expence. The druggiſts ſell them, but theirs are commonly old. Such a quantity of it is raiſed every year in Germany, that good ſeed may always be had. The beſt ſoil is a dry loam, and it does not require a rich piece of land of this kind; ſo that the charge of this article is not great, nor indeed in any other. The ſeeds are to be ſown by hand in a ſparing manner, in ſpring, and harrowed in. When the plants have ſome ſtrength, they are to be thinned. Hoers ſhould be ſent into the field, and ſhould not only cut up weeds, but thin the plants; leaving them at about a foot diſtance, and ſaving ſuch as appear the ſtrongeſt. From this time no farther care need be taken, they will grow quick, and being ſtrong, and thus near to one another, no weeds will get nouriſhment among them. Early in autumn they will begin to flower. The plants branch out toward the top, and the upper part of every branch is loaded with flowers, ſo that the whole field is covered.

The gathering theſe flowers ſo far reſembles that of ſaffron, that they are to be taken as they open; for if left ſeveral days together, they will loſe their colour, and that is their whole value. As ſoon as there is any number of them open, the pickers are to be ſent into the field. The whole buſineſs is done at once. The whole tender part of the flower is to be taken, leaving the ſcaly bud. When thoſe which are open are picked off, they are to be ſpread upon a large floor in an airy place, out of the ſun to dry; and this is all that is to be done to them. When they are dried they look of as beautiful a colour as while growing, and are ready for ſale. Every day the pickers are to be ſent into the field as at firſt, to gather the flowers as they ſhew themſelves, and this is to be the method till all are blown; one parcel being put to dry after another.

If the ſeaſon have been favourable, and the crop have flowered early, ſome ſeeds may ripen; but as this is a great uncertainty, there is no dependance upon it. The better method is to grub up the plants as ſoon as the flowers are gathered, that the land may be prepared for ſome other crop. The dyers purchaſe the flowers; ſome have idly ſuppoſed they were of the ſame nature with ſaffron; but it is ſo far otherwiſe, that as ſaffron is a cordial and ſweat, theſe flowers are a purge; and the ſeeds a vomit.

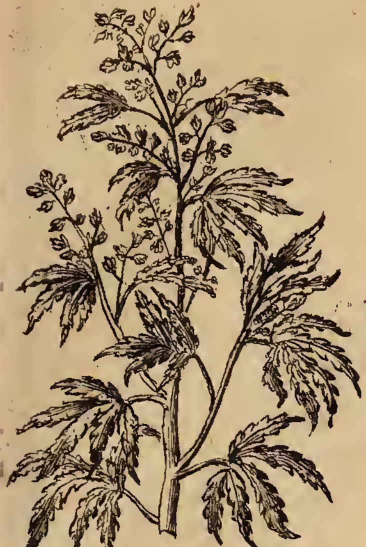
We have mentioned the only right and honeſt uſe of the flowers: but there have been ſome, when it was more cultivated in England, who had a way of mixing it with ſaffron when they worked it in the drying. How improper this was we may know from the difference of the virtues; but there was another reaſon why the farmer never ſhould have done this, for it reduces the price. The thready part of the carthamus is narrow, harſh, dry, and is paler coloured than the blades of ſaffron; therefore no art can ſo blend them together, as to make them capable of impoſing upon any but the ignorant: 'twas the inferior ſort of ſaffron made up from the laſt gatherings that they mixed up in this manner, and it reduced the price of this ſtill lower. One reaſon why the foreign ſaffron is held in ſo much contempt in England is, that there is too often carthamus among it.

CHAP. LXXXIV.

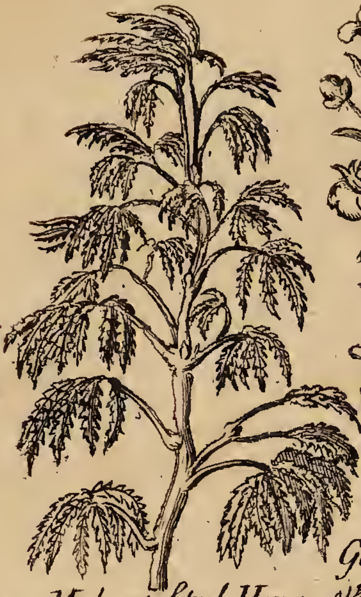
Of Madder.

MADDER is cultivated principally for the dyers; though there is alſo a conſumption among the druggiſts. We ſhall very ſtrongly recommend this to the farmer; for the ſale and the profit are equally certain. A vaſt quantity of madder is annually brought into England; it is brought from places that have no advantage over our own fields; and frequent experience ſhews, the plant will grow and thrive as freely and as well with us.

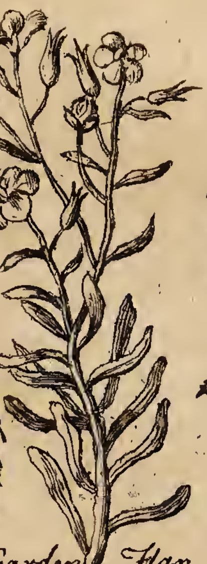
Madder is a plant of very little beauty, it reſembles cleavers, in its manner of growth, but is larger and duſkyer coloured. The ſtalks are ſquare, and of a reddiſh colour; weak, ſo that they lie upon the ground in their lower part; and in the upper, commonly intangle one with another. The leaves are long and narrow, they ſtand ſix at a joint; and are diſpoſed like the rays of a ſtar. Their natural colour is a duſky green, but they ſometimes toward the lower part grow reddiſh. The ſtalk is hairy, but theſe are more ſo; ſo that they prick the hands. The flowers grow at the tops of the ſtalks, and ſmall bunches; they are little, but very numerous, and of a pale yellow. The ſeeds follow, which are contained in a kind of round little heads; the root is extreamly long, and of a beautiful red colour. The cup in which the flower is placed is very ſmall, and ſtands upon the rudiment of that little roundiſh fruit in which the ſeed is to be lodged: it is compoſed of a ſingle green leaf, divided into four little ſegments. The flower is formed of a ſingle leaf, and is a little hollowed



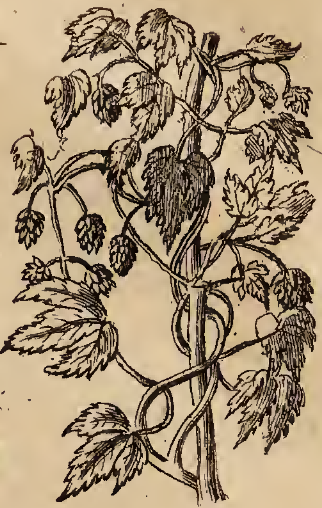
Female Hemp



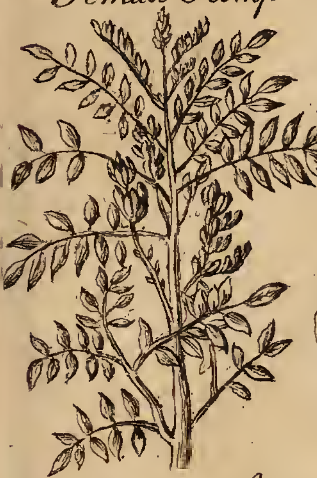
Male or Steel Hemp



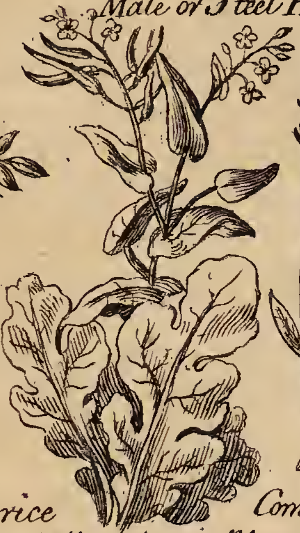
Garden Flax



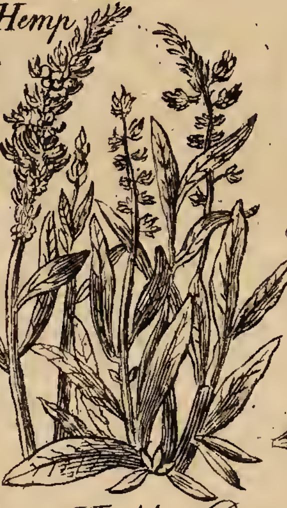
Hops



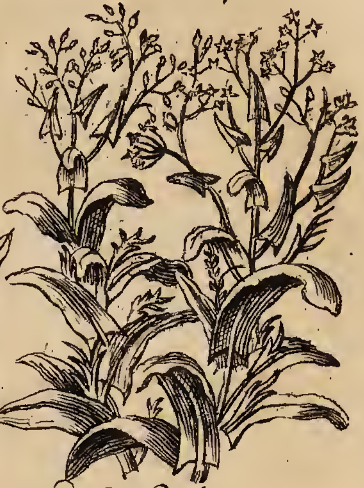
Common Liquorice



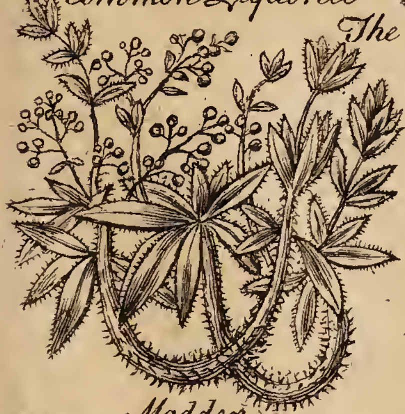
The Coleseed Plant



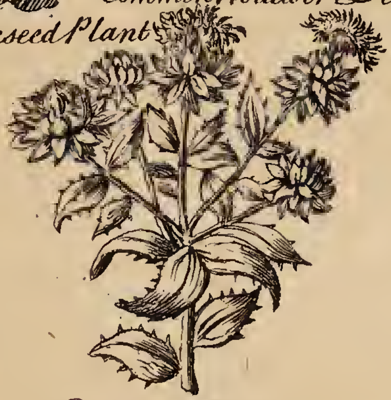
Common Would or Deersweed



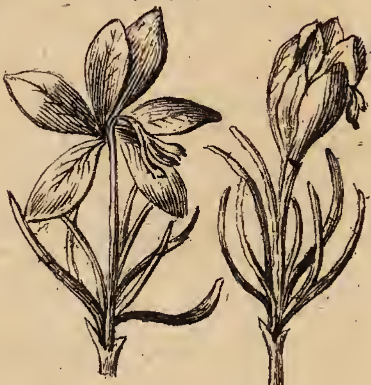
Woad



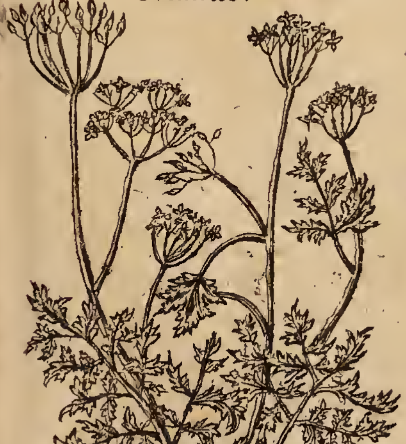
Madder



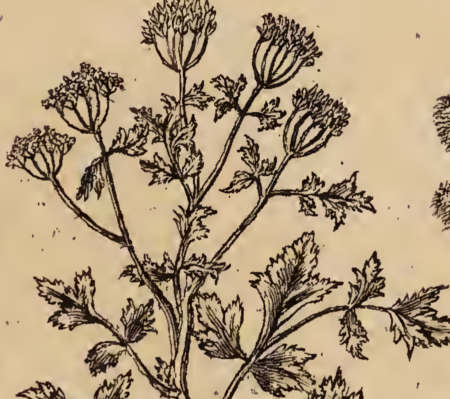
Bastard Saffron



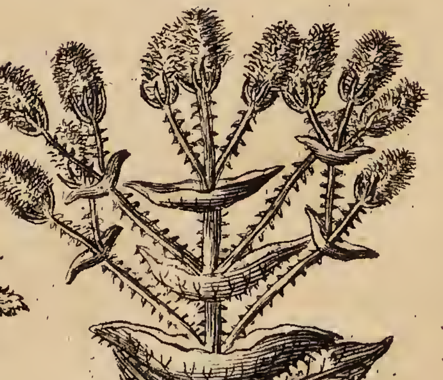
The Saffron Plant



Carraway



Anise



Garden Teasell

Compleat Body of Husbandry

hollowed at the bottom, and divided lightly into four parts. In the centre riſe four ſhort filaments, each terminated by a ſingle button: from the rudiment of the fruit, which, as it enlarges a little, ſhews itſelf to be compoſed of two parts, there riſes a ſingle ſtyle; this is divided into two parts toward the top, each of which has a head to it: this through imperceptible apertures, admits the duſt from the buttons of the other filaments for the ripening of the ſeed veſſel, which then ſwells, and becomes a kind of double berry: in each part of which, or in each berry, is contained a ſingle ſeed.

Two kinds of madder are mentioned by thoſe who treat of plants: the ſix leaved kind, and one which has only four at a joint, but the latter is not worth the farmer's notice. In places where the right kind is cultivated, there grow up a number of plants in waſte places from the ſcattered pieces of roots, and perhaps from ſeeds: theſe being ſmaller than ſuch as have culture, are diſtinguiſhed as a ſeperate kind under the name of wild madder; but they are the ſame plant. Madder is a native of the eaſt, and of ſome parts of Europe: but its roots in the wild ſtate never arrive at perfection for this plain reaſon; that in the latter condition they run in a free, light, wrought ground, where nothing ſtops their progreſs; and though they never attain any conſiderable thickneſs they grow to a vaſt length.

CHAP. LXXXV.

Of the proper ſoil for madder.

THE ſoil for madder ſhould be deep and light. It will get nouriſhment whether the ground be richer or poorer, provided it be not altogether barren. A black mould, ſuch as is common in the fens, is very proper; and is the ſame ſoil whereon they plant it in Flanders: A loamy ſoil that has but little clay in its compoſition, is alſo very proper; or a mixture of loam and mould, as is common in many parts about the edges of the fen countries. This plant would thrive excellently in theſe places; for they have all the advantage of the Flemiſh grounds; and they are drier. The Flemiſh often burſt their roots by their over moiſture, or occaſion an expenſive manner of dreſſing to prevent that accident. It is the nature of the root to extend itſelf in length, and no art can bring it to any great thickneſs; therefore a depth of ſoil is the moſt eſſential point. There are produced a great many ſide roots, which ſpread along under the ſurface of the ground: theſe are the proviſion of nature, for the nouriſhment of the ſtalk and leaves, the principal root taking almoſt all the juices it receives to its own nouriſhment. As the ſtalks and leaves of this plant are of no uſe or value, it is idle to provide for the maintaining them in vigour at the expence of the main root. Theſe horizontal ſhoots never come to any value, and as they only take that nouriſhment which ſhould ſupply the main root, the proper courſe is to deſtroy them.

This account of madder, and of the ſoil that ſuits it, points out a new method of managing the crop to advantage. Of all plants none is ſo perfectly ſuited to the horſehoeing huſbandry. The ſoil is ſuch as ſuits thoſe implements; the method of horſehoeing will moſt effectually cut off the ſhallow and horizontal roots; and as the main roots are to be encouraged in their growth to the utmoſt, no method of planting can be ſo proper as that in rows at a conſiderable diſtance from one another. The culture of this profitable ſpecies, has been recommended frequently and ſtrongly, and has been tried at different times with various ſucceſs, but always with ſome profit: we hope therefore the farmer will be encouraged, from what has been found of the advantages of this crop, in methods leſs ſuited to its nature, to try it in the way we propoſe; in which it cannot fail of very well anſwering his care, expence, and trouble; and there is a reaſonable proſpect of his enriching himſelf by it in a few years.

CHAP. LXXXVI.

Of the management of the ground for madder.

MADDER is to be planted in the ſpring, but the preparation of the ground muſt be undertaken long before. Let the farmer look carefully for a field that has a deep light ſoil, of the nature of thoſe kinds we have mentioned. In autumn, as ſoon as the crop is off, let him plow it up deeply and thoroughly with a four coultered plow. Let him leave it in this condition three months, and then go over it with the ſame plow once again: this will tear it up to a great depth, and thoroughly break and divide it: let him then leave it to itſelf till the end of March: at this time let him look out for ſets in ſome of the garden grounds about London, where a quantity of madder is raiſed for the ſupply of Covent Garden market, and to dry for the druggiſts. In the laſt week in March, let him ſend in his four coultered plow again, ſet to go to the greateſt depth it can. As the ground has been twice plowed before, it will readily give way to this, and the third plowing being well and carefully managed, the whole field will be turned up more than two ſpit deep, and nearly as well wrought as by hand with ſpades, though at a much ſmaller expence. The ſets are now to be taken off from the ſides and heads of the old roots, and the ground is to be harrowed even. Then a line is to be drawn along near the edge, as in the planting of liquorice; and the ſets are to be let into the ground in the ſame manner, at a foot diſtance from one another.

When one row is done, the line is to be removed a foot and half, and another row planted, the ſets in this not being placed oppoſite to thoſe in the other, but juſt over againſt the middle of the ſpaces between. The line is then to be removed to the diſtance of five foot, and drawn ſtraight over the ground as before, and a row of the ſets are to be planted there; thus there will be a third row at five foot diſtance from the ſecond, and at ſix and a half from the firſt: the line is then to be moved again one foot and half, and another, being a fourth row, is to be planted oppoſite the middle diſtances of the laſt.

In this manner the whole ground is to be planted out. The ſets are to ſtand every where at the ſame diſtance in the row, as at firſt ordered; and the whole field will be laid out in double rows, with five foot intervals; the ſpace or partition between one row and another, of each double row, being one foot and a half. When the ſetts are all in and lightly covered up, let the planter go over the places where they ſtand, with a garden rake, and lay the ſurface level. The beginning of April is a ſeaſon when ſhowers are ſeldom wanting, but if it ſhould ſo happen that there are none, there muſt be the labour of once watering the ſets. The beſt time for doing it is on the third day after their planting, and when this is done they may be left to nature.

CHAP. LXXXVII.

Of managing the crop the firſt ſeaſon.

THE plants will quickly appear, and weeds among them. As theſe muſt be principally ſeedlings, they will not at once over-run the proper growth, becauſe that is planted with good roots; ſo that they need not be attacked ſo ſoon as ever they appear; but when they have got a little height, the hand hoers muſt be ſent in to clear the partitions between row and row, not meddling with thoſe in the five foot intervals, except juſt on the outſide of each row. This muſt be done with care. The inſtructions to be given the hoers are theſe. Firſt to take care of the plants of madder, which being ſet regularly, and now up at ſome height, cannot well be miſtaken: the deſtruction but of a few of the plants where they are ſet ſeperate, and each intended for a large growth, will be a conſiderable loſs. This being pointed out to them, they are to cut up all weeds in the partitions, and break the ſurface of the ground as deep as they can with thoſe inſtruments; then they are to clear away between plant and plant of the madder; and thence advancing to the outſide they are to cut up the weeds, and break the ground for about a hoe's breadth all along the rows.

This done the plants are to be left three weeks, in which time they will ſtrike very ſtrongly. The middle of the large intervals will then be full of weeds of ſome growth. The horſehoe is to be ſent in, and it is to cut along the middle of each interval, as deep as it can go. This will thoroughly deſtroy that growth of weeds, and break the ground. The weeds will be buried, and become a kind of manure; and the ends of ſome of the longeſt fibres of the madder roots will be broken off, and new ones will conſequently grow in great quantities from them: there will be a fine quantity of freſh earth for theſe new roots, as alſo for what farther ſhoots the others may make; and it will be full of nouriſhment. The main downright roots are all that are of value. The horizontal or ſpreading ones, that run under the ſurface, are to be conſidered in two lights, as they are larger or as they are ſmaller, for at one of theſe times they impoveriſh, but at the other they feed the main roots: ſo that at one time they are to be nouriſhed, and at another deſtroyed. While they are young they are of advantage to the main root. This is their condition in the preſent inſtance, and it is therefore we are recommending every method to feed and encreaſe them; and on the other hand, we ſhall ſoon after take pains to deſtroy them. The part of the madder above ground, is not ſo large as to demand any vaſt quantity of nouriſhment; the root is puſhing downward, and grows the faſter the more it is ſupplied by its fibres, and the leſs it is drained by the plant above.

This is the caſe at the period of growth whereat the madder is at preſent. The firſt nouriſhment the new planted roots take in, goes to the puſhing ſome fibres from themſelves outward, and a ſhoot of ſtalk and leaf upward. This ſhoot takes up the greater part of the nouriſhment in the firſt days, but afterwards it grows ſlower, and requires a ſmaller proportion of what is drawn. After this there is a period when the main root is taken care of and ſupplied, that it may be able to ſend up nouriſhment in abundance to the herb, when ripening its flowers and ſeeds. For this purpoſe in madder the long horizontal roots grow out every way under the ſurface. Theſe fibres for which we are now ſo carefully providing by the horſehoe, are in time to become thoſe long horizontal or ſide roots. At preſent they are ſerviceable, for they draw nouriſhment in vaſt abundance; which being not demanded in that quantity by the plant in its preſent ſtate, goes according to the deſign of nature, to the feeding and enlarging the main roots. The preſent horſehoeing has vaſtly encouraged, filled, and encreaſed them; but the next is to deſtroy them.

Some time after this there will be weeds again in the partitions, and between plant and plant, the hand hoers muſt be ſent in again to cut them up, and the plants of the madder being kept clear, will have a healthy aſpect, which is very eſſential to the good growth of the root. Some weeks after this, when the madder has grown to a conſiderable ſize, let the horſe hoe be ſent in the ſecond time, with orders to cut much nearer one ſide, or one row, alternately: by this means all the large horizontal roots on that ſide will be cut and broke off, and only ſmall ones will grow from the ends of them, which will tend to the ſervice of the main root again. The hand hoers at this laſt time need not hoe the outſides of all the rows, but only alternately of thoſe near which the horſe hoe is not this time to come; for the next hoeing it is to take the others. This inſtrument could not be brought ſo near the rows while they were young, for fear of tearing up or burying the plants, but they are too well eſtabliſhed now to be in any danger, eſpecially as it is done only on one ſide; for the horſehoe is to be carried along the fartheſt ſide of the next interval all the way, ſo that it never comes near both ſides of the ſame row. The plants will thrive ſurpriſingly, and advance toward their flowering. There will need no more handhoeing, for they will be now of ſuch a ſtrength, as to deſtroy the weeds about them; and the next horſehoeing will compleat the work for the firſt ſeaſon.

This is to be done when the weeds have got ſome head again in the intervals. The inſtrument is now to be carried on the other ſides of the rows alternately, ſo that there will have been a thorough and deep cutting up of the ground, near both ſides of every double row. The large horizontal roots, which would impoveriſh the main root, are now broke and cut off on this ſide alſo; and the main roots, which are large and ſtrong, have all the advantage of nouriſhment. The flower and ſeed of madder are uſeleſs: and we have ſeen, how greatly a plant's running to ſeed impoveriſhes the root. This dictates a new practice in the preſent caſe, which is the cutting down the plants juſt before they are breaking into flower. The farmer is not to cut them down cloſe to the ground; it is enough if he ſtop their running to ſeed: therefore all he has to do is to cut them off half a foot below the top. This will take off all the flower buds, and yet will leave enough of the plant to draw up a quantity of ſap, and keep nature in her proper courſe. By this

means

means a vaſt quantity of rich juice, intended for the perfection of the plant in its ripeneſs, will go to the main root, and the encreaſe in that uſeful part will be ſurpriſing. The ſtalks will ſhoot out ſide branches and grow ſtrong and buſhy. Some of theſe will flower. But the few flowers that grow upon theſe ſhoots are not like the full flowering of the whole growth, they will do no harm, and are not worth regarding.

The firſt ſummer will thus paſs, and the plants not having drawn a vaſt deal of nouriſhment upwards, the roots will be greatly ſtrengthened and encreaſed. All that is to be done afterwards is in the ſame manner to promote the growth of the root, during the reſt of the time it is to remain in the ground, which is the next autumn. A crop of madder, though it remain but eighteen months in the ground, is to be accounted by the farmer as a two years ſtandard, becauſe the preparation of the land takes up the other ſix months. In the uſual way when the roots are taken up for ſale, another piece of land is to be ſought out for the next crop; but in the method we have propoſed, the ſame piece of ground may raiſe madder for ever; and will be fitter for it than any other could.

CHAP. LXXXVIII.

Of managing a crop of madder the ſecond ſeaſon.

ALL the winter ſucceeding the firſt ſummers growth, the ground is to lie quiet: in ſpring, a fortnight before the plants begin to ſhoot, a horſe hoe ſhould be ſent in to cut a deep furrow in the center of every large interval, and the hand hoers to deſtroy thoſe weeds that riſe in the partitions. After this there will be no more care needful about them, but the intervals will have weeds, and ſhould be horſehoed juſt as in the preceding ſummer. This is to be done in the ſame manner as the firſt ſeaſon.

Autumn, when the plants wither, is the time to take up the roots, this muſt be done with care, for the more they are broke in the ground the more of them is loſt. The regular method of planting them is of great uſe, for the people employed to take them up know where to look for them one by one, and where they may, and where they may not, work about them. When they are all taken up they muſt be cleaned from dirt, and after a quantity of fine ſets are ſeperated for a new plantation, the reſt are to be dried for ſale. The dyer will be a ready purchaſer, nor needs the huſbandman fear to overſtock the market. The uſe of the root is to die reds and purples, and as an ingredient in many other colours: and the quantity imported annually from Flanders, Germany, and Holland, amounts to fifteen, twenty, or twenty five thouſand pounds.

CHAP. LXXXIX.

Of planting a ſecond crop of madder.

THE huſbandman may reaſonably promiſe himſelf much larger advantages from the ſecond crop, becauſe he will have, 1. Experience and knowledge in its management. 2. A better ſupply of ſets; and, 3. A fourth part more time for their growth. In the ſetting out ſix months were neceſſary for preparing the ground; but the land is now ready; the five foot intervals have been long in a ſtate of fallow; and they are ready to receive the new plantation. In the beginning of October the ground is clear, and the ſets are taken from the old roots. While theſe are preparing for the ground, let the ground be got ready for them.

The method of planting is to be the ſame as at firſt, in double rows, with a foot and half partition between the two, and with a five foot interval between pair and pair of them. The rows are now to be planted in the middle of the former intervals; and the places where they ſtood before, will become the middles of ſo many new intervals; and theſe enjoying a fallow of two years, with frequent tillage during the whole time, while the new plantation is growing, they will after that be in a condition of a new crop, and ſo on from ſeaſon to ſeaſon; the ſame field by this management being enabled to bear the ſame produce for ever. While the pickers are ſelecting the fineſt and ſtrongeſt ſets, let the four coultered plow be again ſent into the ground. It is to tear up the middle of each interval, and is to be followed by the harrow. By that time the ground is thus wrought, the ſets will be ready, and the ſooner they are let in the better. Theſe will be ſuch in ſtrength and goodneſs, as it would be impoſſible to obtain by purchaſe, and they will ſtrike immediately. The lines are to be drawn as for the firſt plantation, and the ſets let in with the ſame care. They will have time to ſtrengthen themſelves for the following winter, and will be ſo rooted and fixed in the ground by the ſucceeding ſpring, that they will ſhoot in a manner not to be expected from a ſpring plantation. The ground will be now much better than at firſt, becauſe it has been continually turned and new broke during the growth of the other crop: and as the weeds were always deſtroyed in their firſt growth, the whole ſoil is full of nouriſhment.

The madder being planted, is to be managed as the firſt crop: it is to be taken up two years after planting, and it will be found vaſtly preferable to the other. Some who have raiſed madder, propoſe keeping it three years in the ground; but they certainly had not fairly tried the difference. The roots will gain something

thing the third year, but not comparable to the diſadvantage of the loſs of a whole year's time; neither are they always good.

CHAP. XC.

Of the preparing madder root for ſale.

THERE are different ways of managing the root when taken up; and different forms in which it is brought to market: But we adviſe the farmer to think of nothing more than plainly drying it, and ſelling it entire: at leaſt at firſt. It may be very well dried in a hop kiln, with a little fire; and it will always ſell in that ſtate. The other methods of managing it are by ſtripping off the outer rind, then the ſecond bark, and ſo ſelling it in the three forms, of the rind, the fleſh, and the fibre: it may be in either of theſe ſtates ground, and ſold in the condition of powder. For all theſe purpoſes labourers may eaſily be had from the countries where the raiſing of madder is common; and they will ſoon let the owner into the manual operation. Let him firſt raiſe his madder as we have ſhewn, and ſell it plainly dried; and after that, let him get proper people to ſuperintend and manage the ſeveral operations in preparing the root for more advantageous ſale; always having an eye over the work himſelf, and making it his chief care to get into the ſecret of the ſeveral practices. If he omits this, he will lie at the mercy of his ſervants, which is a miſerable as well as hazardous ſituation.

We ſhall here add, the terms by which madder is called in its ſeveral ſtates, according to theſe ways of preparation; and the method at large in which they are manufactured. There is more in it than can well be conveyed in words, for theſe manual operations are to be learned like trades, by practice, not from deſcription; but enough may be ſaid to explain the ſeveral kinds and forms. When the root is only taken out of the ground cleaned from the earth that hangs about it, and dried, and in that ſtate offered to ſale, it is called madder in the branch. A great deal is brought from Flanders in this condition, and our people are very willing to purchaſe it: but as this is the leaſt profitable management, this branch madder is brought principally from thoſe places where the trade is leaſt underſtood, or where they want hands or engines for the managing it according to the other ways.

The firſt management after this affords three ſpecies. In order to the preparing theſe, the root muſt firſt be dried to a certain degree: then its ſeveral parts ſeparating eaſily, they ſtrip off firſt the outer ſkin or rind, and next the fleſhy part, leaving the pith or central matter bare and entire. Theſe they lay in three heaps, and diſtinguiſh by three names. The firſt, which is only the outer rind, is coarſer and fouler than the reſt, this they call mull madder; the ſecond is firm and beautiful: from its running into quills when it comes off entire, which have a round opening at the ends, they call this Letter o madder, and ſometimes Number o madder, or plainly O madder; the third parcel, which is the entire pith of the root, and is of a paler colour than the reſt, they call Crop madder.

Theſe with the plain root are four kinds of madder for ſale, and theſe are in reality all the differences, except the reducing it to powder; but as different kinds according to theſe diſtinctions may be, and are reduced to this condition, they are called by various names. The ground madder is principally of two kinds; it is either the whole root dried, which they call branch madder ground to powder; or it is the middle part, called number o madder. When the entire root is ground, it is uſually ſold under the name of bunch madder; and when the number o madder is ground, its name is looſe madder. Theſe are the terms; which the cultivator of madder will now eaſily underſtand. It is not eſſential to him to follow theſe ſeveral practices, but he will find it profitable. He may always find a ready market for the entire root dried, which is what the purchaſer knows under the name of madder in the branch; and without concerning himſelf farther, may thus make ſuch a profit as will ſurprize the unacquainted with theſe things to hear it named.

CHAP. XCI.

Of teaſil.

THIS is an herb raiſed for the woollen manufacture: and for this reaſon while the woollen manufacture continues ſo important as it is to England, it will be worth the farmer's while to be acquainted with it; and, according to the nature of his ſituation, and the demand, to cultivate it. Teaſil may be raiſed in any place; but it is of cumberſome carriage: therefore he muſt be very imprudent, who ſets about to cultivate it at a diſtance from the places where it is uſed, becauſe nothing need prevent thoſe from doing it who are upon the ſpot; but to ſuch as are, it proves on many occaſions a profitable growth. It does not require the beſt of the farmer's ground; and it demands very little trouble; for after it is once up, it is too ſtrong for weeds.

For theſe reaſons, he will find it may be often his intereſt to raiſe it in the cloathing countries. Teaſil is one of thoſe plants which ſhew moſt obviouſly the effects of culture. We ſee things raiſed to a perfection in gardens, which they never attain in their wild ſtate: but we have ſeldom the opportunities of comparing one with the other. In the teaſil they are always before us. What we call wild teaſil in the hedges, is the ſame with that the farmer is to raiſe for the uſe of the clothier, excepting the difference from culture, and they may always be viewed together to ſee what that is. The heads of the cultivated teaſil are raiſed to a perfection thoſe of the wild kind never reach, and on that change depends entirely their uſe in the manufacture.

The common teaſil is known by its tall ſtalk, and great rough heads; we ſhall therefore confine our deſcription to that plant as improved by culture. The manured teaſil grows to the height of ten foot, and is a robuſt, ſtately, and very regular plant. The root is long, thick, and white. The ſtalk is firm, and of a pale colour, and armed with prickles. The leaves from the root are very large, long, and of a bright green, and are full of ſharp ſtrong prickles. Thoſe on the ſtalk are of the ſame ſhape: they grow in pairs, and joining one another at the bottom, they ſurround it, forming a kind of baſon about it, which holds at all times a great deal of water catched from the dews and rains. Theſe leaves, like the lower ones, are full of ſharp prickles. Toward the top of the ſtalk riſe ſeveral branches, and theſe divide again into others near their extremities; and at the top of every diviſion there grows a large rough head, as big as a man's fiſt, and of a ſomewhat oblong form. This reſembles the head of the common wild teaſil, but is bigger; and as it is covered in both kinds with a kind of ſmall tough prickles, theſe which ſtand nearly ſtrait in the wild, all bend downward in form of hooks, in the manured teaſil. By that circumſtance it is the head is ſo fit for the ſervice of the clothier: it becomes a kind of natural inſtrument for the dreſſing of cloth, which for the number, diſpoſition, toughneſs, and ſpringyneſs of its hooks, exceeds any thing that can be made by art.

Theſe heads contain the flowers, and ſeeds of the plant. Each of the flowers has its particular cup, but that is very ſmall, and ſtands upon the rudiment of the ſeed. The flower is ſmall and hollow, it is a kind of tube, conſiſting of a ſingle leaf, divided into four ſegments at the edge, the upper one a little larger than the others. In the centre riſe four filaments: they are very ſlender, and are longer than the flower, ſo that they hang out; and each of theſe has an incumbent little head, or button, containing the duſt which is to impregnate the ſeed. From the top of the rudiment of the ſeed, and in the centre of theſe filaments riſes the ſtyle of the flower: at the top of which alſo is a button pierced for the reception of that duſt, and the conveying of it to the ripening ſeeds: one of which follows every flower, and is of a longiſh ſhape.

CHAP. XCII.

Of the proper ſoil for teaſil, and its culture.

TO know in what ſoil teaſil will beſt ſucceed, the method is to ſee where it grows wild. It will live in this ſtate almoſt on any ground, but it never is ſeen to thrive ſo well as when it chances to ſtand on a clay, among which there are ſome ſtones. If the farmer who reſides in the neighbourhood of a cloth country, have a piece of ſtony, clayey ground, which is fit for little elſe, and is ſcarce worth the charge of manure, let him ſow it with teaſil: he will be at no other expence than a couple of good plowings, and he will have a crop that will bring him a much larger profit than he could make any other way from ſuch a piece of land, without a great deal of dreſſing and expence.

There is not any plant whoſe culture is leſs underſtood, tho' nothing is ſo eaſy. Moſt adviſe ſowing it in ſpring, and conſequently a great deal of trouble in weeding; and ſome allow it two years growth upon the land. The courſe of nature in the growth of the wild plant is this. The heads ripen in July, the ſeeds fall out, and take root in the ground; they ſhoot up large leaves which ſtand through the winter, and in ſpring the ſtalk riſes in the midſt of them; which toward the end of ſummer flowers, and is in its perfection. If teaſil be ſown in ſpring, weeds will riſe with it, and muſt be hoed up, becauſe they grow quick at that time; but in autumn they are not ſo numerous, nor of ſo quick growth, and therefore the plant will get the better of them. This is more the caſe, becauſe of the natural ſoil of the teaſil, which being clayey, is one wherein few weeds grow, and thoſe not vigorouſly. On this depends the proper culture, which we ſhall therefore direct the farmer to obſerve in the following manner.

A clayey and ſtony ſoil is beſt; but an abſolute clay will do. Let him begin the preparation of it in autumn, as early as he can: becauſe the quicker the ſeed is got in, the more ſtrength it will have in the ſhoot before winter. As ſoon as the ground is clear, let it be plowed deeply with the four coultered plow: after this let it be torn to pieces with the great harrow; and when it has lain a few days, let it be plowed deeply again; this laſt plowing is to be followed by another harrowing, and then it is ready for ſowing. While the land is in this preparation, let the farmer ſeek out for ſeed, and let him take eſpecial care that it be ſound and new. The quantity to be allowed is, a peck to an acre; and it is to be ſown by hand, and harrowed in. The ground may then be left entirely to itſelf till the plants are up, and then there will require only one hoeing with the hand hoe for the whole buſineſs.

When they are of ſuch a ſize that the ſtrongeſt may be diſtinguiſhed from the pooreſt, let the hoers be ſent in. They muſt deſtroy the few weeds there are, and thin the plants, cutting up the weakeſt and leaving the moſt promiſing, at about a foot and a half diſtance. This hoeing will diſpoſe the ground to receive the dews and rains; and the remaining warmth of the weather and following ſhowers, will invigorate the roots, ſo that the leaves will grow larger till they meet, and cover the whole field: after this no weeds can riſe; they will keep the ground moiſt, and by that means nouriſh the roots: in ſpring the ſtalks will riſe, one in the center of each cluſter of leaves, they will grow of themſelves in their natural manner, and toward the end of July will be full of heads. This is the time of gathering them, and it is to be done by cutting and tying them up in middling bundles. Theſe bundles are what they call ſtaves of teaſil, and they require nothing more than to be dried, in order for uſe. If the weather be fair, the farmer needs take no more care than to ſet up the bundles in the field: if there be rain he muſt houſe them, and dry them with a little more trouble. The common produce is about a hundred and fifty, or two hundred bundles to an acre; and at the pooreſt rate they are a profitable crop for ſuch land.

The greateſt part of the teaſil raiſed in England, is in Yorkſhire, and in Eſſex. Thoſe who ſow in ſpring, muſt do it in the ſame manner, but the other way, except under very particular circumſtances, is greatly preferable. If any chuſe to cultivate this plant in the drill and horſehoeing way, there is no doubt but it will anſwer very well, for nothing can furniſh it ſo plentifully with nouriſhment: and in that way alſo the ſurface of the ground would not be at any time ſo perfectly covered by the leaves as it is in the other, becauſe the middle part of the broad intervals would certainly be free. The beſt practice in this way would be to plant it in double rows, with two foot partitions, and five foot intervals between pair and pair of rows. The number of plants would be leſs upon an acre, but probably the number of heads would be greater, becauſe each plant being ſo well nouriſhed would afford more, and they would be bettrr in their kind.

CHAP. XCIII.

Of aniſeed.

WE receive aniſeed from the Levant, where it is cultivated, in the Greek iſlands, and ſome other places; but it may be raiſed at home. Not only we are remiſs in this article, but other nations, for the world is in a manner ſupplied from thoſe few places. Not only reaſon and the little experience we have in gardens, ſhew the plant will live with us; but the more full and perfect experience of the fields where it has been ſown, and has come up, and grown to a perfect maturity.

The plant which produces this ſeed, and is called the aniſe, is not unlike parſley in its manner of growth. It grows to two foot and a half in height. The root is long and white, but there is a great deal of difference in the ſhape of the leaves, thoſe from the roots are compoſed of roundiſh parts, and thoſe on the ſtalk are more divided; 'tis theſe latter that have moſt the aſpect of parſley, and they are of a pale colour. The tufts of flowers are moderately large, but the ſeparate flowers are ſmall, they are white, and are ſucceeded each by two ſeeds which grow together. The whole tuft of flowers, which is what is called an umbell, has no ſurrounding leaves as thoſe of many other kinds have; and the ſeparate flowers whereof it is compoſed, have ſcarce any viſible cup. Each flower conſiſts of five little leaves, which are of an oval figure, and bend backward: in the center riſe five filaments, each having at its top a little head or button; among theſe grows a ſingle filament, divided into two at the upper part. This is the ſtyle of the flower, it grows upon the rudiment of the fruit, which is compoſed of two ſeeds joined cloſe together, which ripen and ſeparate when the flower is fallen.

CHAP. XCIV.

Of the cultivation of aniſeed.

ANISE is to be ſown in ſpring, but the ground muſt be well prepared for it beforehand. Therefore let the farmer who intends to raiſe it, look out for a piece of ground during the ſummer, that he may go to work upon it in autumn. The proper ſoil is a dry rich loam; ſuch a one as has a good deal of ſand, but little clay, and a good quantity of fine mould in its compoſition. The beſt ſituation is in a warm valley, where the place is ſheltered by hedges, and is not in the way of wet.

Such a piece of ground being choſen, let it be well plowed up in autumn, and a quantity of half rotted dung ſtrewed over it. Let the plowing be repeated two or three times between that and ſpring, that the manure may be well mixed; and then let it all be harrowed fine, and ſmooth as a border in a garden. It is then in a condition to be ſowed; but the weather muſt be watched. Aniſe is a quick growing plant, ſo that it need not be hurried into the ground: the danger is that of the cold rains, which ſometimes fall early in this ſeaſon, and it may be eaſily guarded againſt theſe, by keeping the ſeed out of the ground till that period is over. Writers talk of the great tenderneſs of aniſe, and the difficulty of raiſing it: but it is all owing to their having ſown it too early. They direct February, whereas it will ſucceed very well if ſown in April.

There is no difficulty in raiſing aniſe in England, and little hazard, unleſs what riſes from ignorance: this is worth ſearching to the bottom, becauſe it may prove a very valuable commodity: the price is not great as we import it, but when we conſider the vaſt quantity of ſeed which all theſe plants bear, we ſhall find that it will amount to a very conſiderable value from an acre.

The farmer is to ſee that he get good ſeed, the ſoundneſs is one great article, and the freſhneſs another. Let him be very careful in examining the ſeed he buys; its weight and cleanneſs are tokens of its being ſound, and the brightneſs of its colour ſhews beſt its being new. The ſeed is to be ſown ſparingly; and when it is come up, it is to be hoed by the hand hoe, the hoers cutting up weeds, and thinning the plant to about ſix inches diſtance.

In this condition they are to ſtand till they have flowered, and the ſeed is ripened, and the time for gathering them is juſt when it begins to harden. The beſt way of gathering this crop is by pulling up the plants: for they root very ſlightly. After this they are to be houſed, that they may dry without waſte, and the ſeed is then to be thraſhed off for ſale.

CHAP. XCV.

Of caraway ſeed.

THIS ſeed is as well known as aniſe, and grows upon a plant ſomewhat reſembling it. It may be cultivated in England in the ſame manner, but with leſs charge and hazard, for it is hardier; and yields the greater advantage, as it does not periſh when the firſt quantity of ſeed is ripened, but lives ſeveral years. The caraway plant is four foot high; the root is long and white, and is of a pleaſant taſte. The leaves are large and very finely divided. The ſtalk grows up in the midſt of theſe, and is hollow, ſtriated on the ſurface, and divided into to a great many branches. On theſe ſtand leaves like thoſe that riſe from the root, only ſmaller, all divided into very narrow and fine parts: at the tops of the branches grow tufts or umbells of white flowers; after which come the ſeeds, growing two together. The whole tuft has no leaves about its bottom, nor have the ſingle flowers any cup, except ſo ſmall a one as is ſcarce obſervable. There are two or three other kinds of the caraway plant, named by writers on botany; but only the common ſort, which we have here deſcribed, is worth the huſbandman's notice.

The proper ſoil for raiſing it is a deep, rich, mellow earth, the more like garden ground the better. If there be ſome ſand among it, provided not in too large a quantity, it is not the worſe, wherefore a rich loam will do. This land ſhould be plowed in autumn, and again in the beginning of February: a week after this it is to be harrowed, and then it is ready for ſowing. Let the farmer ſee he buys ſuch ſeed as is ſound and good. The quantity is ſeven pound to an acre. When this is ſown as evenly as can be, it is to be harrowed in, and then left to ſhoot.

When the plants are three inches high, the hoers are to be ſent into the ground, but they muſt, both in this and aniſe, be well inſtructed in the appearance of the plants, which otherwiſe they will be very apt to cut up among the weeds. They muſt hoe up the weeds, and thin the plants where they are too thick, cutting up the pooreſt, and leaving the others at eight inches diſtance. The plants will thrive after it in a ſurpriſing manner, and they may be, for the reſt of the ſummer, left to themſelves, for they will get ſtrength before a new crop of weeds can riſe. The crop is not to be expected the firſt ſummer. Some of the plants will run up to ſeed, and if ſo many do as are worth cutting, it may be done, but often 'tis otherwiſe: the farmer muſt not lay his account to have a crop the firſt year. The field is to lie the whole winter untouched: in ſpring it is to be hoed again, and the ſame in Auguſt, and ſoon after this laſt hoeing the ſeed will ripen. There will be a large crop, and the ſame for three or four ſucceeding years, which is to be cut up, dried, and thraſhed for ſale.

Having thus treated of the ſeveral particulars under this denomination, we ſhall give a few general chapters on the great article of ſowing, and with that cloſe the account of tillage and its objects.

CHAP. XCVI.

Of ſowing.

IN ſowing two things are to be conſidered, the nature of ſeed, and the temper of the ground. Some kinds of ſeed will bear wet, others will be injured by it; and ſome land is fitteſt for ſowing when wet, other kinds when dry. It is a rule among the gardeners to ſow dry and ſet wet, but this will not hold altogether with the huſbandman. His fields are a larger garden, and he muſt not be confined to ſuch narrow rules. The temper of the ground proper for ſowing, depends upon its natural condition; all lands ſhould have ſome moiſture when ſown, but the drieſt ſhould have moſt. A land naturally moiſt may be ſown in any weather, but dry ſoils may be ſown in weather that is very wet, provided the ſeed will bear wet. Wheat muſt be ſowed when the earth is moiſt. It can hardly be too wet, for this ſeed not only will bear moiſture, but requires it: on the contrary, rye cannot bear it.

Farmers obſerve the ſeaſon for ſowing, and when that is come, get in their wheat be the weather what it will, for this reaſon it ſometimes will lie ſix weeks in the ground without any viſible ſhoot. The firſt good rains bring it up, if they come in time: if not there is but a poor appearance, for often the greateſt part will ſpoil with ſo long lying in the earth. Let our farmer in this, as in all other things, follow reaſon and experience, rather than a blind cuſtom. Let him uſe the common ſeaſon, if the common weather happen in it; if not let him ſtay beyond that time. Thoſe who fixed the ſeaſon of ſowing wheat, did it becauſe rains uſually fall at that ſeaſon; if any year it ſo happens that they do not, let him wait till they do: he will thus better obſerve the ſenſe of the rule, than thoſe who ſtick to the day.

Wheat is not the only kind that requires moiſture: but moſt ſeeds ſucceed very well; nay, many of them beſt without it. Black oats require as much as wheat, therefore let the farmer never ſow them but in ſuch a ſeaſon: barley does very well in a dry time, and all the ſummer corn in general. Nature takes care of the ſeeds of wild herbs. They fall at any time when they are ripe, and be the ſeaſon what it will they grow. Some are loſt; but enough remain. This is plain, becauſe no kind of plant whatſoever has been loſt ſince the creation. We read in very old authors of the herbs of their time, they do not mention a great number, but all they have deſcribed diſtinctly, are found to this day.

The later writers have been more curious in ſetting down the names and figures of a vaſt variety, and in the ſame manner all they have named continue in their places; or if they are loſt in one, they are found in another. Theſe are ſown as accident directs, and they ſucceed; here is no regard to wet or dry, yet they proſper. This is true, but let it not miſlead the farmer. Far from too much, there is too little care taken in the ſowing of corn, let him be doubly aſſiduous not remiſs.

Theſe plants which nature ſows at random, are only to keep up the ſpecies; the wheat ſown by the huſbandman is to be conſumed in food in the far greater part: and after it has fed millions, enough is to remain for keeping up the ſpecies. This is a great difference, and requires all his care. It may be ſaid in the ſame manner, that the earth ſerves for theſe ſeeds of herbs that are wild, without tillage, or any careful manner of placing them in the ground; they fall as chance directs, and yet they grow. The anſwer is the ſame, that a ſmall ſupply only is wanted from them, therefore this caſual way of ſowing is enough; if much of the grain were required for other uſes, then care and culture would be needful.

The creator of all things ſaw the condition of wheat, and thoſe other grains he intended for the ſupport of man's life, and he knew they would therefore have his care and labour for their production. The others which were of no ſuch immediate uſe or value, he foreſaw would be taken little care of, he therefore provided for their ſucceeding of themſelves: and it is wonderful in what various and elegant manner. They are in general incloſed in a caſe, ſerving as a womb, in which they are retained till at perfect maturity, and which then opening diſcharges them to the ground. They therefore do not fall till ripe, and fit for growing; and they are ſuited to preſerve themſelves in a proper ſtate, and keep in a proper place, in a ſurpriſing manner. Thoſe intended to root about the mother plant are ſmall and heavy, ſo that falling they ſhoot at once: this we ſee in henbane, and others. Thoſe which are intended for ſpreading, are winged with down, as thoſe of the thiſtles. Such as by their lightneſs would be carried away by every puff of wind, have hooks and prickles to detain them, as ſeeds of clivers, avens, and burdock. Agrimony ſeed alſo is rough, ſo that it lays hold of any thing. Many of theſe are intended for the banks of fields, where they could not lie but for theſe hooks and prickles, that ſerve to keep them in their places. The ſeeds of ſome, which are to be ſcattered at a diſtance, are lodged in caſes or fruits, that toſs them out by their ſpring in breaking, ſuch as wood ſorrel and the wild cucumber; and ſome, that they may not riſe in cluſters together, have a kind of wings by which they are influenced by the wind, to move about upon the ground; the aſh key and the pine kernel are an inſtance. As this provides againſt thoſe trees riſing cloſe to one another, in which caſe they could not thrive, ſo the other is generally given where there is a creeping root. Wood ſorrel runs a great way in the ground by the root, and therefore this ſcattering of the ſeeds to a diſtance is more uſeful. Though theſe take their chance as to the weather, and yet ſucceed, yet there are ſome that require to be ſown only in peculiar ſeaſons. Thus blue gentian will not ſucceed unleſs ſown when there is wet, but nature has provided accordingly, for the ſeeds are lodged in a caſe that holds them firm in dry weather, but ſplits at the firſt drop of rain that falls upon it.

Thus nature provides for weeds by various means, though they be little regarded: corn is left to the care of man, becauſe of its value, let him not therefore neglect it. It requires a particular caution as well as labour, but the trouble and expence are well returned. He who underſtands beſt how to employ his labour will have the beſt crop. Nothing is more inconſiderately done than the ſowing in the common way. A certain time is fixed upon, without regard to the weather, which ought to be the chief point; and in the uſual way the ſeed is ſcattered at random, from the hand of an unſkilful perſon, and covered unequally. It falls too thick in ſome places, and too thin in others: and in ſome it is buried ſo deep it cannot riſe, while in other places it is burnt up by lying naked on the ſurface. Every ſeed has its proper weather for ſowing its proper thickneſs upon the ground, and its proper depth at which to be covered: theſe are the three great articles. We have ſhewn the regard that is to be had to the weather, for the different kinds; and the rules by which their depth and diſtance may be found. England had great obligation to that earl of Caſtlemain who brought over the original drill plow, or Sembrador, from Spain; and the world as great to Leucatello, who invented it: but their ſervices would have been of little uſe if not of late revived by Mr. Tull. They had ſlept many years, and would have been altogether loſt and forgotten. His praiſe therefore is no leſs than that of the inventor or importer of the machine.

CHAP. XCVII.

Of the nature of wheat ſeed, and the particular manner of ſowing it.

THE reaſon why wheat requires a particular care, and a particular ſeaſon for the ſowing is, that it is a tender grain.

Rye is hardy, and therefore will ſucceed, under the ſame condition wherein wheat will come to little. Of all our grain wheat is leaſt able to bear the ſeverity of cold; and yet from its time of growth 'tis neceſſary to ſow it before winter. It has therefore all that hard ſeaſon to get through, and this is the difficulty. As it muſt live through the winter, the farmer is to defend it as well as he can againſt the cold, and the beſt way is, by taking care that the earth lie hard about it during that ſeaſon. This is in a great meaſure provided by ſowing it in wet weather, the ſoil then cloſing and caking upon it; but this brings on another difficulty. Wheat, of all corn, requires the moſt nouriſhment; and it cannot ſearch for it by the roots, unleſs thoſe roots can ſpread; nor can they do this except the ground be properly looſe and free. Therefore, as the condition of wheat requires the ground to be compact about it in winter, it requires it alſo to be looſe in ſpring. This is very difficultly to be managed in the common way of huſbandry, but it does very well in the drilling and horſehoeing. The depth at which it is let in by the drill, gives the earth opportunity to cloſe about its roots, and defend it from the froſts; and the breaking the ground between the rows, by hoeing in ſpring, divides the ſoil, and makes way for them to paſs in ſearch of nouriſhment. Therefore the drill and horſehoeing huſbandry is moſt ſuited to wheat, which is the moſt valuable grain; 'tis fit the huſbandman perfectly underſtand the nature of this capital grain, if not he will forfeit half the profit of his harveſt by the ſowing. There are general rules for ſowing which hold true in moſt caſes, but wheat is an exception to others of them, beſide that we have named.

'Tis a rule to ſow on the ground as ſoon as 'tis plowed, that the ſeed may have the advantage of the freſh tillage. This to moſt kinds is very great; but with wheat another method is to be followed. Let the land be plowed when it is dry, and let it lie till there come rains to wet it. 'Tis proper to wait for this advantage, though the earth lie three weeks before ſowing, after the plowing. If the land be indeed a ſandy loam, the clayey part of which is binding, 'tis beſt to ſow it dry, as well as plow it in that condition. In this caſe let the ſowing come directly after the plowing.

Theſe are the general rules, but let them be underſtood with diſcretion: though the ground ſhould be plowed dry for wheat, it ſhould not be ſo dry that the duſt ſhould fly; and though it ſhould be drilled wet, it ſhould not be like haſty-pudding. Moderately dry and moderately wet is what we mean by the direction. The difference between ground broken wet and dry, may be ſeen in banking. A bank made of wet earth will keep firm many years; when one of the ſame ground dry will moulder continually. Let the ſeed time be deferred till the ground is ſufficiently wet, and the dry plowed land will never fail to produce larger crops than the wet.

The conſequence of plowing wet is almoſt equal to that of banking; a piece of land plowed wet in November, will be harder in ſpring than one plowed dry in Auguſt. All ground grows hard by lying: but this effect of wet out-does that of time. When the land that has been plowed dry is wet enough for ſowing, let it be once harrowed lightly, juſt to level it, and then ſown.

Wheat may be drilled any time between harveſt and November, but in general 'tis better to drill earlier than thoſe who ſow in the common way, than later. When wheat is ſown early leſs ſeed is required: poor land ſhould have more ſeed than rich, becauſe more of the plants will be deſtroyed on the poorer land in winter. Beſide the plants thriving better on rich land, will have each more ſtalks, ſo that one of them will be equal to many on poor ground.

C H A P. XCVIII.

Of the proportion of ſeed wheat to the land.

THE quantity of ſeed corn ſowed in the new method of huſbandry is a very conſiderable article in its recommendation; the proper quantity for an acre of middling land is from four to ſix gallons, this will ſurprize ſuch as are not uſed to that huſbandry, but the very ſmalleſt proportion here named is often ſufficient. If the land be rich, and be ready for drilling early, four gallons of middling ſeed will be enough. The danger of drilling it too thick is, that it will fall; and when too thin the quantity is often diminiſhed farther, by its blighting in ſpring. When it is planted early leſs ſerves, becauſe it is more ſafe; that which is drilled late being found, by all experience, more liable to accidents from worms and many other cauſes.

Where there is danger of worms, the proper caution is to plant it ſhallow. Wheat will come up if covered three inches deep, and it will ſtand very well if not deeper than an inch; therefore let the farmer proportion the depth to the particular circumſtances and ſeaſon of his ſowing. The way worms deſtroy wheat is by eating off the thread that is continued from the grain to the blade. Worms lie deeper in winter than at other ſeaſons, by way of defending themſelves from cold, therefore when the corn is drilled ſhallow they never come near that thread. As the quantity in the drill method is much leſs than in the common way of ſowing, the more care muſt be taken that it be preſerved. The rooks are great deſtroyers, they muſt be kept off the land about the time of its firſt ſhooting. This is the only period when they are dangerous. Boys muſt be employed to fright them away. The farmer muſt not ſtay till he ſees the blade up. It is true the rooks will not meddle with it till it has ſhot, but they ſee this before the owner. Juſt when it peeps above ground they devour it. They tear it up for the ſake of the ſeed, which is then plump and full: when the ſhoot has been up a few days the flower is exhauſted, and they will not meddle with it. That wheat is ſafeſt from rooks which is planted neareſt harveſt time, there is then a great deal of corn ſcattered on the ground, and they feed well. While they have plenty of this they will not look for the other.

CHAP. XCIX.

Of ſowing turnip ſeed.

MICHAELMAS is the beſt time for ſowing wheat. Much ſooner it cannot be ſown; and it is not prudent to do it a great deal later. In turnips we are not to be ſo particular. They may be ſown from May to Auguſt; the farmer is to guide himſelf by the nature of his land. In a moderate piece of ground, about Midſummer, is the beſt time; in poorer land they ſhould be ſown ſix weeks ſooner, and ſuch as is very fine, it may be let alone till ſix weeks later. Turnips, on a very good field, will be as forward if ſown at this late time, as on a poor one at the earlieſt. As to the quantity of ſeed, we have obſerved, what a vaſt difference the drilling makes from the common method; four pounds is often allowed to an acre in the common way, and in the drilling method four ounces is enough. In the drill method wheat may be ſown upon the ſame piece with turnips; managed thus. The turnips muſt be ſown early, they will then be well grown by Michaelmas; and that is the time for ſowing the wheat. The turnips being in diſtant rows wheat may be ſown between them, the earth being properly broke for that purpoſe. Almoſt all the earth may then be taken from the turnips; and thus they may ſtand with the wheat during the winter. In ſpring they are to be pulled up, and the wheat is then to be left to take all the advantage of the ground till harveſt.

CHAP. C.

Of ſowing beans.

THE ſeaſon for ſowing beans is February, and the moſt proper earth ſuch as will retain ſome wet. The ſpring rains follow, and the crop ſeldom fails unleſs for want of a due moiſture, ſo that it muſt be an unnatural ſeaſon alone that can prevent their thriving. Provided they have this advantage they get a good firſt ſhoot, and no weather that comes afterwards can hurt them; the richer the land the better for beans, provided it have this firmneſs to hold the wet. A loamy field, with ſome good mixture of fine earth, is the proper place for this crop, few know the value of horſe beans for want of underſtanding the proper ſoil, ſeed time, and manner of ſowing: we ſhall endeavour to inſtruct our huſbandman on each head, from the reſult of experience. We have mentioned the improvement of clayey ſoils by ſand, a ſoil ſo amended becomes a loam of the beſt kind. Theſe clays ſeldom fail to have rich earth among them, and though in their original and natural ſtate they locked it up, and it was of no advantage, yet when thus divided by the ſand, broken by tillage, and calcined by the ſun and air, they become a very rich land, and are able to retain a great deal of moiſture: theſe therefore are the beſt ſoils for beans. The next are loamy, with a good mixture of mould among them. Let a field like this be choſen for beans, let them be ſown the third week in February; and if they have the advantage of a dripping ſpring, the crop ſhall be equal in value to one of barley.

We have ſhewn the advantage of horſehoeing to wheat, in cauſing a great number of ſtalks to riſe from one root, and each to have a great deal of corn. The ſame effect is produced by this practice in reſpect of beans. I have counted ninety-five pods upon one ſtalk, all well fed and full of ſeed well nouriſhed; and a common number is ſixty or ſeventy on a ſtalk when thus managed. The land cannot eaſily be turned to a better account. As loamy ſoils are the beſt for beans, ſandy are the worſt, yet there are wet ſands that have ſome clay in their compoſition, though not enough to get them the name of loams, which ſucceed very well with this growth. In theſe caſes the ſeed ſhould be always drilled in rows at four foot diſtance, and a farmer who manages properly may get a good crop of turnips between. When any one has a deſire to raiſe beans upon a land that is not naturally ſuited to them, he muſt encreaſe the quantity of ſeed, and be particularly careful in the ſowing. Many of the plants will come to little; and if part of the ſeed be loſt by careleſſneſs in getting it into the ground, and the reſt bear but a poor quantity, there muſt be a miſerable proſpect. Dry weather always hurts beans, and when they ſtand thin it deſtroys them. When too few plants riſe weeds will come up abundantly, and get ſtrength and over-power them. On good land three buſhels will ſow an acre, but it is better, when it is any thing leſs than the beſt, to ſow four; and on ſoils that are poor or dry five buſhels.

There are two ways of ſowing them in the ordinary huſbandry, by the broad caſt; and plowing them in: for this laſt the ſeedſman follows the narrow wheel plow, and throws in the ſeed from his hand in a direct line, all the way along the furrow: this is called ſpraining them in. The furrow is left open in this way by the plow, but the next turn covers it, and the beans are buried to a good depth.

Another way of ſowing, or rather planting horſe beans is by hand: it is practiſed in ſeveral parts of England, at a moderate expence. Women do it, and the method is this. The land is plowed light, and the women draw lines in it at a foot and half diſtance. They have a dibber in their hands, and beans in their apron, and they work by the line; the dibber is an old ſpade handle cut off to five inches length, and tipped at the point with iron. They have this in their right hand, and they take out the beans from their apron with their left. They ſtrike the dibber into the ground, and drop a horſe bean into the hole. They thus plant the beans at about three inches diſtance, in rows eighteen inches aſunder. This is a very proper poſition, and a regular method of planting them, and 'tis done with ſo much eaſe that the expence is moderate. When the whole field is planted they go over it with a harrow, which ſufficiently covers the beans; and then give them two handhoeings before harveſt. This is nearly of kin to the drill and horſehoeing huſbandry, but it is not equal; as we have ſhewn: for this handhoeing only ſcratches the ſurface of the ground, whereas the other tears and breaks it to ſuch a depth, as to invite the roots of the crop where the nouriſhment is moſt abundant.

In Wiltſhire they plow lengthwiſe, never acroſs, and ſow their beans by the broad caſt twice in a place, they then harrow them in, and ſo leave them to their chance. In the other places they don't harrow till about the time when the beans are juſt going to ſhoot, then they go over the ground carefully with the common harrow. This tears up the young growth of weeds, and breaks and divides the ground at the ſurface, covering up the heads of the beans; immediately after the harrow they draw over a moderate roller, which fixes the ſoil at the ſurface, and levels all for the ſcythe at harveſt. The drill method of ſowing is beſt of all, and the due diſtance betwen the rows not only gives opportunity for horſehoeing, which vaſtly ſtrengthens the growth, but the plants having a free paſſage for the air to their bottoms, bloſſom and bear fruit all the way down. This vaſtly encreaſes the quantity, and at the ſame time ripens them better. Though the horſe bean is what the farmer means when he talks of his bean crop: yet this is not the only kind that is cultivated in fields, they ſow five other ſorts in the ſame manner about London, and in other places where there is a large demand, for ſupplying the markets; theſe are the Windſor and Sandwich, the Broadſtock, the Liſbon and the Hotſpur, this laſt is a ſmall bean, but is valued for its earlineſs and good flavour.

There is alſo another kind brought into uſe of late; and this is properly the country farmer's concern: this is the tick bean, it is properly a horſe bean, but is much broader than the common, and anſwers better on every occaſion. This is beſt planted by hand with the dibber, and the rows ought to be at leaſt two foot aſunder. The common method of managing theſe is by the hand hoe, and it does a great deal of ſervice, tho' not equal to what would be done by the horſehoeing. They give them two hoeings: when they firſt ſhoot up they come in with the hoe, and cut up all the weeds between the rows, and at the ſame time earth up the beans: then, when they are about ſix inches high, they come in and hoe them up again, this ſecond earthing is of great benefit to the beans, and the weeds being deſtroyed at this growth, are rarely troubleſome again.

Some have ſuppoſed, from hearing the huſbandmen talk of ſmall ticks and large ticks, that there were two kind of beans of this denomination, but this is not the caſe. There is but one kind of bean properly thus called. It is a horſe bean of the ſize of the hotſpur bean, and is hardy and very fruitful. What ſome call the ſmall tick is only the common horſe bean. The tick bean is more hearty and nouriſhing than the common horſe-bean, but as it is larger it requires longer drying. When this is done imperfectly in the field, the way is to finiſh it on a large floor in an airy place, or in a kiln. The ſafeſt method of keeping them is to ſplit them and dry them afterwards; in this caſe they are never liable to any accident. They mix excellently with oats, chaff or bran, and are of great ſervice to cattle. There have been times when bean bread was eaten for want of corn flour, and no harm ever happened from it: on the contrary, it was found to be more ſtrengthening than any other.

End of the NINTH BOOK.

A COM-

A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK X.

Of the natural and artificial Products of the Farmer's Stock.

CHAP.
1. *Of milk, and its natural production.*
2. *Of the nature of milk.*
3. *Of the ſeveral kinds of milk.*
4. *Of cows milk, and its general differences.*
5. *Of chuſing a milch cow.*
6. *Of the quantity of milk yielded by each cow.*
7. *Of the times of milking.*
8. *Of the manner of milking.*
9. *Of ordering the milk in the dairy.*
10. *Of the veſſels of the dairy.*
11. *Of ſetting the milk for cream.*
12. *Of ſkimming the cream.*
13. *Of the management of the cream.*
14. *Of butter.*
15. *Of churning.*
16. *Particular rules relating to churning.*
17. *Of the waſhing and making up of butter.*
18. *Of making butter from new milk.*

CHAP.
19. *Of ſalting of butter.*
20. *Of whey butter.*
21. *A method of taking off the ill taſte of milk.*
22. *Of the uſe of the barrel churn.*
23. *Of cheeſe.*
24. *Of rennet or cheeſe bag.*
25. *Of new milk cheeſe.*
26. *Of a one meal cheeſe.*
27. *Of ſkim milk cheeſe.*
28. *Of cheſhire cheeſe.*
29. *The way in which cheſhire cheeſe is made.*
30. *Of making cheeſe like cheſhire in other places.*
31. *Of making ſheeps milk cheeſe.*
32. *To make a nettle cheeſe.*
33. *To make a running cheeſe.*
34. *Somerſetſhire cheeſe.*
35, 36, *to* 45. *Of the early uſe of wool, and methods of managing it in different parts of Europe.*
46. *Of hides and leather.*

The INTRODUCTION.

WE have conſidered that important article of ſtocking the farm, and acquainted our huſbandman with the ſeveral breeds of thoſe animals which he is to feed upon its produce for labour or profit. And have ſince gone through thoſe ſeveral articles by which he is to procure them food, and in which he is to uſe their ſervice. This done, we come to treat of thoſe benefits he receives from them in their ſeveral products, and to lay down the beſt manner wherein he is able to uſe them to his advantage.

We divide theſe products into natural and artificial, as they are of two kinds, properly coming under thoſe two denominations; one part of them ariſing naturally, and being uſed in the condition in which he receives them; the other requiring art and management to bring them into the ſtate that is fit for ſale. Of the firſt kind are milk and wool; theſe he receives from the udder, or ſheers from the back; and he may ſell them as they are: the artificial kinds ariſe from the uſe or manufacturing of the former. Butter and cheeſe, though originally owing to milk, yet are not obtained without manual labour and art. Theſe we call the artificial products of the ſtock; and under the one or other of thoſe names, we comprehend the whole produce from theſe animals. The farmer of one place may be inſtructed by reading the practice of another. We propoſe therefore to lay before our readers, the ſubſtance of what others have practiſed; and upon the whole to build a ſyſtem for the conduct and management of theſe important articles; which reaſon ſhall countenance, and, we doubt not, experience afterwards approve.

CHAP. I.

Of milk, and its natural production.

MILK is ſeparated from the nutritious juice of bodies depoſited by nature in the udders of female animals, during their pregnancy, and intended for the nouriſhment of their young. After the young is born it comes in greater abundance: and it will be prepared and furniſhed by nature in that plentiful manner, ſo long as it is ſucked, or any other way drawn at times: but when no uſe is made of it, the ſupply ceaſes; and the milk dries up of itſelf. We have mentioned the udders of pregnant females as the natural place for milk; but the curious have diſcovered, and ſometimes accidents have ſhewn, that it is not limited to that ſex, or that ſtate; male creatures, both human and of the brute kind, have had milk; and females which have not been in a ſtate of pregnancy.

The Roman charity ſo famous in hiſtory and paintings, is an inſtance of the latter in the human ſpecies: an old man confined in a dungeon, was ſupported by ſucking the breaſts of his daughter a virgin. So long ſince as the time of Ariſtotle, it was known that ſome men had been found to have milk in their breaſts: and Cardan upon his own knowledge relates the ſame, averring, that there was ſuch a quantity in one man, that a child might be nouriſhed by it. Pliny relates the ſame of a man in his time, and Aldrovand of another. Theſe authorities ſo numerous are not to be doubted; nor is the thing confined to the human ſpecies. We have a circumſtantial account in the philoſophical tranſactions, of a weather ſheep giving ſuck to a lamb; and that not wantonly or for once, but in a regular quantity, and enough for the ſupport of the young creature many months. Wonderful as all theſe accounts appear, there is not in reality any thing ſo ſtrange in them, when the matter is fully weighed. Nature has provided breaſts and udders, with their teats and nipples, for all females, younger as well as grown up; and to the males ſhe has given the ſame parts, by way of conformity, though not intended for the ſame ſervice.

Milk is a natural juice, and although prepared regularly at a certain period, yet being formed from the nouriſhment of the body, it may be produced at any other time; and as the nouriſhment of men is the ſame with that of women, there is no reaſon why it ſhould not, if wanted, be ſupplied by one as well as the other. Sucking will make it continue to flow when it otherwiſe would have dried up; and there is not much more wonder that the ſame force ſhould bring it to a place naturally deſtined for it, even at a time when it would not otherwiſe have come.

This method of reaſoning, plain and familiar as it is, will very well explain the breaſts of virgins affording milk on being ſucked; and we ſhall not, upon a like rational enquiry, find it any thing more ſtrange, that the ſame force ſhould bring it into the breaſts of the other ſex, whether in human or brute creatures. In men the texture of the breaſts is not very unlike that of womens, and the nipples are of the ſame ſtructure entirely. We have no reaſon to ſuppoſe the reſemblance ſtops here. Indeed anatomy ſhews that it does not, and therefore as the parts are of the ſame ſtructure, and there is the ſame nouriſhment for the purpoſe, it is not ſtrange that ſucking ſhould produce it.

The moſt plain reader may underſtand theſe reaſonings; and ſo it is throughout all nature: hard words are only cloaks for ignorance. We believe it will from this appear, that far from diſcrediting the ſtories, they have heard or read of milk in virgins, and milk in male creatures, our impartial readers will join with us in opinion, that the wonder is rather that ſuch things are not more common. It is not ſtraining the point too far to ſay, that probably any virgin grown near maturity, or any man in health, would give milk if ſucked ſome time for it; and the ſame is doubtleſs equally true of animals of other kinds. This ſeems to be a proviſion of nature, careful of all her productions, as a laſt reſource in caſe of extream neceſſity for the tender and defenceleſs young of animals, which from accidents would otherwiſe be loſt.

CHAP. II.

Of the nature of milk.

MILK is of the nature of chyle, that is, the nutritious juice ſeparated from our food, and intended for the ſupport and nouriſhment of our bodies. All our foods tend to the formation of chyle, and the purpoſe of nature in their digeſtion is the furniſhing a ſufficient ſupply of it: for on this the reſtoration and preſervation of the fabric depend. Chyle is a thin white juice, conſiſting of the fineſt and moſt nouriſhing part of our food; and milk is properly ſpeaking, nothing more than a thicker and richer chyle; when the two are compared together, there is found no other difference between them; therefore we may very reaſonably conclude, that milk not only is made of chyle, but that it is made by a very natural and eaſy procedure. A quantity of chyle has been brought into the glands of the breaſt, and there ſome of its watery parts have been ſeparated; and the remainder becoming richer by that means, has been left there ready to be drawn by the mouth of the young, or otherwiſe, in the form of what we call milk. Upon examination by glaſſes, we find it ſtill conſiſts of only a ſmall part of real and rich nouriſhment, mixed with a larger quantity of a watery fluid; and this the progreſs of nature when milk is left to itſelf to ſpoil, or is managed uſefully in the dairy alſo confirms; for whether milk become unmixed, as we may ſay by the courſe of nature, or by management for uſeful purpoſes, ſtill the ſame thing is found; namely, a ſmaller quantity of rich matter, and a much larger of a watery fluid.

Milk viewed with powerful glaſſes, is diſcovered to conſiſt of two different matters; the one white and rich which is kept ſeparate in round drops, and the other thin and watery: this laſt is the more large quantity, and the other drops ſwim in it. When we make butter and cheeſe, we force a ſeparation of thoſe parts, which we could not ſee to be diſtinct in the milk, though this common operation ſhews they were ſo: the rich part makes the butter and cheeſe, and the other runs off poor and watery in the butter-milk and the whey. This is a proof of the truth of what Lewenhoeck firſt ſaw by glaſſes, and it is thus the common operations of our lives illuſtrate the truths of philoſophy.

CHAP. III.

Of the ſeveral kinds of milk.

MILK is a richer kind of chyle. It is compoſed of more rich and ſolid, and more fluid and watery parts; and the operations of the dairy inform us farther. Philoſophy ſhews us only two parts in milk, but experience diſcovers three: the buttery, the cheeſy, and the wheyey. The buttery parts being of an oily texture, ſeparate moſt eaſily, and get to the top. We find butter to be of the nature of oil, and oil will ſwim upon water. Therefore theſe three ſeparate parts of which milk is compoſed, are of three different qualities. By firſt underſtanding them, we ſhall perfectly comprehend all the operations by which it is ſuited to our various uſes.

The three parts are, 1. The oily; 2. The curdy; and, 3. The watery. The oily are the buttery parts; the curdy are the cheeſy, and the watery are the wheyey. Nothing but the force of nature in the body of the animal, could blend theſe perfectly into one rich and nouriſhing fluid, fit for the tender ſtomach of the young. They are ſo mixed there, that they continue mixed in that manner for ſome time, after the milk is out of the body; but when they have once ſeparated, either naturally or by art, we ſhall never be able to mix them ſo again. Butter, cheeſe, and whey were contained in the milk, but all our chymiſtry will never be able to mix theſe three into milk again.

Milk differs in various creatures according to their diet, their conſtruction of body, and the particular ſtructure of thoſe parts in which it is formed. The great end of nature in the production of milk, is for the nouriſhment of the young; ſhe knows, or to uſe more proper words, God whoſe immediate and regular care in the guidance of the world, is what we call nature, knows beſt the ſtructure of thoſe young and tender bodies; and he has accordingly provided in the breaſts and udders of their dams, a nouriſhment ſuited to them. In ſome creatures more of the watery parts of the chyle are ſeparated, and in others fewer, according to the ſtructure of the veſſels; and in ſome the chyle comes more watery to thoſe glands that ſeparate it, than it does in others: why otherwiſe ſhould it be, that the milk of the cow ſhould be ſo rich, and that of the aſs ſo poor, when both eat the graſs of the ſame paſture.

Phyſicians uſe aſſes milk to reſtore decayed conſtitutions, becauſe it is poorer than cows, for the ſtomach in thoſe perſons is not able to bear the rich milk of the cow. The different conſtruction of body, and fabrick of the veſſels occaſion milk to be richer in ſome creatures and poorer in others. Having premiſed this, we ſhall proceed to conſider ſeparately, thoſe ſeveral kinds that come under the farmer's conſideration. Theſe are four: the cows, the aſſes, the goats, and the ſheep: a fifth might be added, for the milk of the mare is uſed in ſome places; but the firſt named kind is the great and principal concern of the farmer, and the ſupport of the dairy.

As to the preference of aſſes milk above that of the cow, in the relief of human kind, the reaſon is ſhewn in nature. Let the milk of our own ſpecies be compared with that of a cow, and that of an aſs; and the aſſes milk will be found to reſemble it much more than the other. As it is commonly the misfortune of perſons afflicted with ſuch diſorders as require the aſſiſtance of milk, to have ſuch ſharp juices on their ſtomach, as turn it to curd; the remedy is to ſweeten or take off the ſharpneſs of thoſe juices: phyſicians preſcribe various things for that purpoſe, but there is nothing equal to chalk ground to a very fine powder, and given in a little of the milk.

CHAP. IV.

Of cows milk, and its general differences.

COWS milk is the richeſt of all the kinds, and the moſt profitable: its products in butter and cheeſe, being alſo preferable to thoſe of all others, not only in quality but in quantity: two articles which conſtitute the higheſt uſe and value to the owner. The milk of the cow is ſuppoſed to vary according to the colour of her ſkin, but this is an idle obſervation. There is an old ſaying, that red cows give the beſt milk; and black cows bring the fineſt calves: but we can aſſure our reader that there is not the leaſt truth in either of theſe maxims. We have ſeen as much and as good milk from black cows, as ever was produced from red; and we may call all Smithfield to witneſs, that the value of the calf is not in the leaſt dependent upon the colour of the cow.

In a former part of this work, we delivered rules for the choice of cattle for their ſeveral purpoſes. In general, the cow to be choſen for the dairy ſhould be large, big boned, yet well ſhaped, and of the biggeſt breed. This was always the choice of the cow, and this ſuits her as well for the ſhambles as the pail: when the breeds of cattle were kept more entire, Wiltſhire was the place from whence this large kind principally came, and the breed there was moſtly red: from hence it became uſual to call the Wiltſhire breed, the red breed; and thence inſtead of ſaying the Wiltſhire cow gave the beſt milk, people uſed to ſay the red cow gave the beſt; thoſe two words ſignifying at that time the very ſame thing. An error or confuſion of ſpeaking of the ſame kind, gave origin to the vulgar notion of the black cow bringing the beſt calf. The Lancaſhire breed were famous for their calves; and they were generally black: thus a black cow, and a Lancaſhire cow, became two expreſſions for the ſame thing; and when they meant to ſay, the Lancaſhire was the beſt for a calf, they named the colour, and not the place.

This has been the occaſion of the vulgar error, and there is no more truth at preſent in the preference of the red cows milk, than in any idle common ſaying. While the breeds of kine were kept diſtinct, there was ſome meaning in it; though in reference to the colour, it was only accidental; but now the breeds are ſo mixed and confounded by introducing one among another, that nothing certain is to be deduced from the whole matter. There is an article which does in reality make an alteration in the milk of cows, and that is the paſturage, and manner of feeding: this we have, in general, conſidered already. The reader will find it in our diſcourſe on the cow kind, to which we refer him to avoid repetition.

CHAP. V.

Of the chuſing a milch cow.

WE have before given at large the marks of cattle, which are beſt in their ſeveral kinds; but we ſhall here add for the ſervice of the dairy, ſuch particulars as are of immediate reference thereto.

Having fixed upon a cow that is large and well ſhaped, let the houſewife examine whether ſhe be gentle and kindly. There are in theſe creatures differences of diſpoſitions, as well as among ourſelves, and it is in vain to think they can be altered. The cow being a creature that muſt be always about the houſe, her gentleneſs is a very eſſential point; and if ſhe be of a very unruly diſpoſition, it will reduce half her value.

The marks by which a cow may be judged to be formed for plenty of milk, are a large and handſome udder, with a proper number of teats, which is four, with no additional or ill ſhaped ones; but theſe four all long, thick, and ſmall at the ends. After the udder, let the neck be examined, this ſhould be thin, and ſhould have a large and hairy dewlap. The horns are by many ſuppoſed to denote a large quantity of milk when they are ſhort and crumpled, nor is this mark to be utterly neglected. The beſt Dutch and Alderney cows have theſe ſhort and crumpled horns, and they are ſuperior to any other for the ſervice of the dairy. The horn being an eſſential mark of the breed in theſe, may therefore be conſidered as a mark of plenty of milk.

When cows are to be purchaſed for the dairy, it is material to have them all of the ſame kind or breed; and to take care the bull be of the ſame breed alſo. The breeds are at this time ſadly mixed and confounded in England; but as the number cannot be had entirely of one particular kind, let them be as near as poſſible of the ſame make, ſize, and ſhape. The colour is of no conſequence. Let his whole care be employed to have them all good, and like one another: they will herd the more kindly together, and he will have a breed of his own better than what he at firſt purchaſed.

We have one thing yet to mention, with reſpect to the choice of a cow for the dairy, which is often in the houſewife's mouth, and ſhould be always in her mind: this is what they call depth of milk. They mean the quantity the cow is like to furniſh: and there are ways of judging this, without error. A cow gives the largeſt quantity of milk, when ſhe has newly calved: let the produce be well examined at that time; for if it be deficient then, it will never be better. There are cows that have more, and others that have leſs milk, without any viſible reaſon for it; therefore in this, only experience can guide. The owner ſhould keep or diſpoſe of his cows accordingly: ſo that by degrees he will exchange or ſell, and purchaſe again, till he have at length not a cow in his yard but yields as much as a cow well can. If the difference in a ſingle cow be ſomething, 'tis very great in the produce of a number; and this is a certainty, the quantity of milk does not depend upon the quantity of food, though the quality of it often does upon the nature of the food. A cow that is ſtarved will not yield much: but if a couple of cows be watched, one of which is deep in milk and the other not, ſhe that is the leaſt profitable, will be found to conſume as much provender as the other.

CHAP. VI.

Of the quantity of milk yielded by each cow.

THERE is alſo great variation in milk, in reſpect of the age, time, breed, and ſize of the cow, ſo that it is not only difficult but impoſſible to fix any ſtandard of the quantity a cow ſhould, may, or ought to yield: yet that the owner may form ſome gueſs whether his dairy be ſupplied moderately, poorly, or very well, we ſhall give ſome general calculations of what may be expected. Not only the nature of the cow will make a difference in the quantity of milk; but the time of her calving. Let not the farmer therefore think the leſs of a general rule becauſe there may be an exception to it, from the particular conſtitution of the cow; all general rules admit ſome exceptions. Let him obſerve what milk his cow yields ſoon after calving, whether it be more or leſs, and mark her down accordingly: but though he ſet down that which yields a great deal at this time for keeping, and that which yields but little, for ſale; yet let him continue both in his yard through the year, and examine them as they go on.

Often a cow that gives a great deal at firſt, ſoon falls off, and yields leſs than common; and ſome go dry a month, two months, and ſome three months, before they calve again, whereas others will yield their quantity to the laſt. The ſame cow that is deep in milk once, will continue ſo; and ſhe that one year gives little, will not be eaſily made to yield more another. It often happens, that one of thoſe which yield a great quantity when they have firſt calved, will grow dry ten weeks or three months before calving again; and one which yields moderately at firſt, will continue it till the very day of her next calving. When a cow yields but little at firſt, ſhe can never be worth keeping for the dairy, and therefore ſhould be diſpoſed off at once, and her place in the yard ſupplied by one more profitable; but a cow that yields moderately, though not greatly, and continues it the year round, may be worth more to her owner than one of thoſe that yield a great deal at firſt, and grow dry for ſeveral weeks. This muſt be regarded; for the preference of one of thoſe cows over the other, cannot be made without a computation of the whole produce for that length of time. A great deal depends as to the quantity of milk upon the time the cow is to calve; and as this makes ſo great an alteration in the annual produce, we cannot ſtate the account without it.

The beſt and moſt favourable time for calving, in order to yielding the greateſt plenty of milk is, when the paſturage is ſpringing in all its ſtrength, for then it will make the greateſt ſupply. Therefore thoſe who wiſh for abundance of milk, are happy if their calves fall in the end of March, or the beginning of April, for at that ſeaſon the graſs is in its fulleſt ſpringing ſtrength. The calves at this time are not profitable for rearing, becauſe they muſt be fed upon the cow's beſt milk; but an early cow, the calf being ſold to the butcher, is vaſtly preferable in point of the abundance of milk, to one that is later.

To ſpeak of the milk in its moſt favourable time for quantity, and under the beſt circumſtances, we will compute that of a new milch cow firſt turned to graſs in April. The produce of ſuch a cow may be computed between five quarts and twelve at a milking; and many accidents which make this difference have cauſes ſo beyond our reach to know, that it is often impoſſible to gueſs any thing before-hand. Three gallons, Wincheſter meaſure, at a time, is a very great and rich produce; two gallons is a very fine quantity: a cow that gives five quarts at a milking, which we have ſet at the loweſt worth keeping, is a very good one, if ſhe will continue it the whole year round; ſo that ſhe is worth trying: but the cow that yields leſs than a gallon is to be rejected, and her place ſupplied by another. In general, the cow may be ſaid to yield very well that gives a gallon and half at a time, if there be a proper continuance of that quantity. If this be rightly managed it will yield a ſixth part cream, that is, one quart of good rich cream for every time of milking each cow; and this will yield very well a pound of butter.

CHAP. VII.

Of the times of milking.

THE two great points upon which the profit of a dairy depends are the hours of milking, and the proper ordering of the milk when brought into the houſe. The firſt may ſeem a ſmall concern in compariſon of the other, but thoſe who have had experience know it is of great importance. A cow ſhould be milked twice in the four and twenty hours: there are thoſe who approve of three times, but upon trial I have found that the quantity of milk obtained at twice milking at twelve hours diſtance, has been more than that got by three times milking at ſix hours diſtance in the day, and leaving the night for reſt.

This laſt practice, however recommended, proves on trial to be erroneous: 'tis only a teazing of nature: 'tis expecting what cannot be performed, for a ſupply worth taking, or needful to be taken, cannot be made in leſs than twelve hours: beſide, nature loves regularity; and in our way of two milkings in the four and twenty hours, each may be at twelve hours diſtance; whereas in the other, the common way is to have two intervals of only ſix hours each, and one of twelve. Thoſe who underſtand the bodies of animals, know there is not this difference to be made between the hours of eating and reſt; for though the creature eat only in the day, digeſtion goes on all night, and therefore the times of milking ought to be at regular diſtances. This is ſhewn by experience, becauſe we find a cow with an udder full in the morning after ſleeping, as well as in the evening after the whole day's feeding.

There are cows that it is ſaid require three times milking in the four and twenty hours, becauſe otherwiſe they will ſhed their milk: this would ſeem an objection; but from all that I have ſeen, the neceſſity has been owing either to a cuſtom of doing it, or to ſome diſtemper in the udder. What nature has been accuſtomed to, ſhe expects; therefore if a cow have been uſed to be milked thrice a day, ſhe will require it; but the quantity will not be at all more than if ſhe were milked only twice; as to her ſhedding the milk if not taken at theſe times, it is to be conſider'd as a diſorder, being certainly no other; and what a ſickly or diſtempered creature requires, is not to be made a rule for the management of one in health.

Having eſtabliſhed twice in the four and twenty hours, as the proper periods of milking, the next thing is to ſettle at what time it ſhall be done. But this is liable to uncertainty. In many places there are certain ſtated hours for the ſale of milk, and when any conſiderable quantity of it is intended to be diſpoſed of that way, the times of milking muſt be adapted to thoſe hours: thus in and about London, and other large towns, there are certain hours at the which families are uſed to take in milk; and the retailers are uſed to have it at the hours juſt before; ſo that the profeſſed cowkeeper, who intends this uſe of his milk, muſt accommodate the times of milking accordingly. The country farmer who keeps his dairy for his own uſe, and ſets the greateſt part that his cows yield for cream, may take what times of milking he pleaſes; and then it is his buſineſs to chuſe ſuch as are moſt natural. In ſummer, the moſt natural times are morning and evening: between ſix and ſeven in the morning, and toward ſeven in the evening. There are no hours at which the udders of the cows are ſo naturally diſtended with milk; conſequently none at which it is ſo much an eaſe to themſelves to milk them; or at which they yield ſo freely. The morning gives the milk formed in the whole night's reſt and digeſtion; and the evening gives that made from the abundant food of the day; part of which, from the quantity taken in, muſt be converted into nouriſhment at the time: the remainder during the hours of repoſe.

As the days lengthen toward Midſummer, the hours may be a little earlier and a little later, but not much; as the days ſhorten after Michaelmas, they muſt of neceſſity be changed for ſuch as are conſiderably later in the morning, and earlier in the afternoon. As to the third time of milking, thoſe perſons who approve of it, generally make it ſix hours after the morning milking, which places it ſix hours before the evening time in ſummer, and makes it about the middle of the day. We have ſhewn that it is prejudicial to the creatures, and of no advantage to the farmer; and as it requires more trouble and attendance of ſervants, it neceſſarily brings on more expence, which is another diſadvantage. Milking cows three times a day, makes them dry up the ſooner. I had been led to believe at one time, that it would be a way to keep them in milk the year round, and made trials in my own ſtock, carefully minuting down the obſervations, but the effect was exactly the contrary: ſo that ſeeing the matter in all poſſible lights, this third milking is a diſadvantageous practice.

I have met with ſome farmers who have been ſtrongly of opinion, that the cow's keeping in milk to the time of her calving again, was not to their advantage; for that the milk being drawn away all that time weakened the calf. This is another of thoſe ſpecious reaſonings which nothing ſets aſide but experience. I have examined and obſerved this difference in reſpect of the calves, not once or twice, but many repeated times, and can aſſure the farmer, that a cow's yielding milk to the very time of her coming again, is no diſadvantage to the calf that is to come, but rather a help. A calf in the body of the cow is more likely to have too much nouriſhment than too little; and for one which comes into the world poor and ſtarved, twenty come full of groſs humours. Want of nouriſhment is a fault ſoon mended, for the milk is rich and abundant, ſo that rarely any harm happens from this; whereas the bringing into the world with them an abundance of humours and a groſſneſs of habit, is commonly their deſtruction. Therefore it is greatly to the advantage of the farmer, that his cows ſhould go the year round with milk, and conſequently it becomes his intereſt to watch and obſerve them the whole time.

CHAP. VIII.

Of the manner of milking.

THIS may ſeem a conſideration too trivial for ſuch a work as ours, but we ſhall not neglect it: nothing is trivial that may prove of conſequence; and it is owing to this vanity of over-looking things of importance, under the name of frivolous and unworthy conſideration, that the greateſt part of the writings on this ſubject are uſeleſs. Milking is very trivial and very eaſy; but 'tis not enough underſtood. It is entruſted to perſons who have little ſenſe or conſideration, and who learn it they don't know how; nor does the owner concern himſelf whether they do it well or ill. There is a great deal of difference between handling the teats gently and roughly; and ſome knowledge is required to tell how the milk ſhall be got with moſt eaſe to the creature.

Milking, when carefully performed, is an eaſe and pleaſure to the cow; but it may be ſo managed, and it too often is, that 'tis a pain and torment to her. There are cows naturally ill-conditioned, but theſe are not common; the greater part of the accidents that happen in this way, and are laid to the fault of the cow, are owing to the rough and ill conduct of the perſons employed to milk her.

The farmer is not unfrequently diſtreſſed by the diſorders of the cow's teats, and the hedgehog is now blamed, as the fairy uſed to be formerly of being the occaſion of thoſe diſorders: in general, the urchine is as innocent as the ſpirit; and the diſorders are owing to hurts in handling the teats. When the milker goes to her work ſhe muſt take the near ſide of the cow, and begin by gently handling and ſtroaking down the teats; and from time to time ſhe muſt moiſten them with milk, to make them ſupple and pliable. By this they will be brought to anſwer her touch much better, and will yield the milk more readily and freely, and that without any pain to the creature. The quantity in the udder is a burthen to the cow, and ſhe wiſhes earneſtly to be relieved from it; but if that be done with harſhneſs, ſo as to occaſion more pain for the time than the load of milk, ſhe will avoid it: on the other hand, if ſhe be milked kindly and gently, beginning as we have directed, not only the eaſing her of the load is a relief, but the very manner of doing it is a pleaſure. Every mother who has given ſuck knows there is a pleaſure in performing that office to the infant, independent of any thought of the mind: this pleaſure is in the nipple itſelf, and this the whole creation of females that give ſuck have; and it is the ſame in milking.

To the rude method of handling the teats is owing a great deal of the ill diſpoſition of ſome cows; and to the kind and gentle treatment others receive that they are gentle themſelves. A cow that is well fed will have her udder full at certain times, and when ſhe knows ſhe can be relieved from that load without pain, ſhe will come of herſelf to the pail, and will ſtand with ſatisfaction. We have ſaid in what manner the milkmaid is to begin her work, and ſhall add how ſhe is to continue. She muſt not fix herſelf, nor ſet her pail firm to the ground, till ſhe has got the cow to ſtand ſure and quiet: theſe creatures are often reſtleſs in the beginning, but they will ſtand ſtill enough when the milk has come for a little while freely. This muſt be watched, becauſe the milk that is got will be otherwiſe in danger. The cow is a heavy creature, and a little kick of her foot will bring the pail down.

When ſhe is once ſettled, and the milkmaid is ſeated, and all goes on for ſome minutes right, there is leſs danger, but ſtill the woman muſt be upon her guard, a cow may ſtart at any time, and ſhe muſt have her eye upon all her motions, and her hand upon the pail, ready to remove it on occaſion, otherwiſe the over-turning of a pail is very eaſy, and the milk may be all loſt in a moment, that this careful eye might have ſaved. When the cow is quiet and ſeems pleaſed with the milking, let the woman go on boldly; that which would have pained the creature cruelly at firſt, will not hurt her at all now, the teats have been handled, moiſtened, and rendered ſupple; let her therefore now pull and ſtrain them freely, and draw as long as any milk will come.

The worſt fault a milker can be guilty of is, the not doing it clean and thoroughly. Let the farmer or his wife frequently ſee to this: they ſhould give all their milkers orders to take care, that not a drop of milk be left in the udder when they leave off; and they ſhould ſee at times, when they are at their work, whether thoſe directions are punctually followed. If there were nothing but the loſs of ſo much milk as is left in the udder, that would be ſome conſideration, for in a number of cows it would amount to what was conſiderable; and this twice a day would, in the year's courſe, make a great diminution in the profits of the dairy: perhaps this alone would make the difference of four or five cows in a year, and the farmer knows the value of their keeping well enough, to be ſenſible what a fault that would be. But there is a greater conſideration: for there is nothing that tends to keep a cow ſo full in milk, as the conſtantly milking her quite clean. This depends upon the courſe of nature in furniſhing the udder with milk, as we have ſhewn. While it is drained nature gives a continual and conſtant ſupply, whether that draining be done by the mouth of the young or the hand of the milkmaid; but as ſoon as no more is drawn no more is provided. This is the caſe at large when the young dies, or the creature is any way left untouched; and the ſame thing holds good, in a proportioned degree, when ſhe is careleſsly milked, and the udder is not well drained. When that is perfectly emptied at times, nature goes on vigorouſly with a ſupply; but when it is done imperfectly ſhe performs her work languidly, and there is not that free and full ſupply any longer. The farmer knows the importance of keeping his cows deep in milk, and a long time in it; and it is fit he ſhould thoroughly conſider how much that depends upon the milkmaid's doing her duty.

Another caution to be given to all milkers is, that they make themſelves as familiar and friendly with the cows as poſſible. By gentleneſs and kind treatment they will come to know them, and will go to the pail like rational creatures. While they are milking, common diſcretion will teach the perſon not to do any thing to ſtartle or frighten them; and it is a good caution alſo to let them go quietly and eaſily away. I have ſeen many drive their cows away haſtily and roughly, as ſoon as they had done, as if they never were to have any thing to do with them again. All creatures have memory: the cow does not forget this; and it makes her ſhy or troubleſome the next time.

C H A P. IX.

Of ordering the milk in the dairy.

THE farmer has ſeen every article neceſſary to be done in obtaining his milk from the cow, let him now take care of it when he has got it; he has taken the proper meaſures for having the beſt cows; for getting the moſt from them; for keeping them long to it; and for avoiding miſchief in the drawing it: we will ſuppoſe it therefore in the pails, and bringing home; and that he is deſirous to make the dairy fit to receive it in the beſt manner.

The firſt thing in a dairy is cleanlineſs. Not only all the veſſels but the floor, walls, and cieling; every thing that is in it, and every thing that is about it, muſt be managed with the utmoſt nicety of cleanneſs, or there will be continual damage and loſs. The dread that ſhould always be uppermoſt in a dairy is of ſourneſs; and to keep things from ſouring, the receipt is, keep them clean.

Milk will at the beſt keep but a little while. All the art and all the care in the world cannot preſerve it long: it will become ſour, and there is the great damage. When it has once got ſour it will ſpread the miſchief: this is what the miſtreſs of the dairy is to employ all her care to prevent; and the far greateſt part of that care centers in the ſame point cleanlineſs. The foulneſs of a dairy is uſually from corrupted milk or cream, and this muſt be cleaned away perfectly, for it will otherwiſe not only communicate itſelf to whatever is near it, but will infect the very air of the room, to the prejudice of the whole quantity that is brought into it, and of every thing that is going forwards. What the old houſewives uſed to attribute to witches and fairies, was in reality the effect of ſomething ſour left in the dairy; this was the natural and real cauſe, but the effects of it are ſo great and ſo perplexing, to ſuch as do not know the cauſe, that no wonder they thought witchcraft had a hand in it.

Here lies the firſt article of cleanlineſs, which is to take care no ſpoiled remains of a former buſineſs hang about the dairy; that nothing ſour remain in any crack or crevice; for this end all the pails, pans, and veſſels, muſt be daily cleaned; and for this reaſon glazed earthen ware is preferable to any other materials for them, becauſe nothing ſticks to it, there are no crevices in it, and one may always ſee whether it be clean. Thoſe who are at all acquainted with the buſineſs of a dairy, know how nice and tickliſh all the works of it are; therefore let them take care not to add to the hazard by foulneſs. We have mentioned rhe remains of any thing ſour firſt, becauſe that is a miſchief that ſpreads ſo quick and ſo far, but we are alſo to caution the houſewife againſt greaſe, dirt, or filth of any kind whatſoever; for every thing that does not belong to the work of the dairy hinders it. There is no way to clean and ſweeten the veſſels, but by ſcalding them with boiling water, and then ſetting them out in the air: the firſt cleanſes off all filth that is viſible to the eye, and the latter removes any taint by purifying and evaporating all that remained about them. There is nothing equal to the ſun, wind, and air, for purifying things after proper cleaning, and this practice ſhould be uſed in the dairy every day, whether the things appear dirty or no; there may be filth about them that is not ſeen, and the leaſt of it will do miſchief.

CHAP. X.

Of the veſſels of the dairy.

THE uſe of the dairy is to make from the natural milk, ſuch products as the farmer ſhall find turn beſt to his account; and the ſeveral veſſels employed in it all tend to that purpoſe. Theſe we are to conſider in two lights, with reſpect to their form and their materials. As to their form, we are not ignorant of the many new inventions that have been ſtarted for the facilitating the operations of the dairy; nor do we utterly adviſe the farmer from regarding them: but this caution we ſhall give him, that he do not rely too much upon the words of their inventors, or of thoſe who have ſo warmly recommended them. Theſe have been in general people of ingenuity, but of no experience. They have ſeen the conveniences that might attend ſomething of the nature of what they propoſed, but they have not perceived what might be the inconveniences of their own particular inventions; therefore the practical dairyman, is to try before he approves: he is obliged to thoſe gentlemen for the hint, but he is to determine for himſelf, for he can do it much better than they, whether it can be reduced to practice.

Thus the reaſonable huſbandman will conſider all that is offered for the improvement of his profeſſion, neither rejecting at random, nor adopting without proof. Many things appear feaſible in the cloſet, that are impracticable in the field: there is therefore no way of judging of them but by the help of that experience firſt, which their ingenious inventors wanted; and afterwards, if this experience joins in the opinion, then to bring them to a trial. 'Tis thus we adviſe the farmer to conſider the new improvements of a dairy; and having given him this rule of practice with reſpect to the new, we ſhall proceed to inform him in the management of the old: theſe are ſure; and to confeſs a truth diſagreeable perhaps to the inventors of new ſchemes on this head, I have never yet found upon trial, that any others, with all their ſpecious promiſes, exceeded them.

People of fortune who have amuſed themſelves with the pleaſures of a dairy in the country, have covered their walls with Dutch tiles; and had their veſſels of China; and this is extreamly right. As to the veſſels, China are in this reſpect as good for uſe as glazed earthen ware, but not in the leaſt better, for they are covered in the ſame manner with a glazing; and ſo a veſſel be glazed, and the glazing whole and without flaws, 'tis no matter whether it were done in the Eaſt Indies or at home. There is a difference in the materials uſed in the manufactures of Europe and the eaſt, but it is not material in this conſideration. Our glazing for theſe veſſels is made of lead, and theirs is only a kind of earth mixed up in water, but the effect is the ſame. Either is a glaſſy or ſhelly ſubſtance which the milk cannot penetrate, and therefore they equally anſwer the purpoſe. As to the covering the walls with tiles it is certainly right, as it anſwers two purpoſes, both very eſſential to a dairy, cleanlineſs and coolneſs. I have ſeen a dairy in Wiltſhire lined throughout with lead, and it had alſo a very good effect. The expence of this laſt method will appear conſiderable at firſt, but taking in the whole account nothing is ſo cheap. It laſts from generation to generation without repairs, and it has always a very conſiderable intrinſick value: ſo much lead is worth ſo much money at any time.

The uſual kinds of veſſels are three, earthen ware glazed, wood naked, or wood lined with lead. As to the firſt we have ſpoken, the ſecond is very good, but it has leſs natural coolneſs, and is not ſo eaſily made clean as the earthen ware;

the lead has all the advantage of coolneſs, and may eaſily enough be kept clean. The difference is not very great, but the reaſon will eaſily be ſeen in what we have here ſaid, why we give the preference to the earthen veſſel. Where the dairy lies low, and is in itſelf very cool, wooden veſſels do better than elſewhere; and where there is a very great buſineſs carried on, there is convenience in wood lined with lead, becauſe veſſels may thus be made of ſuch a form and bigneſs, as cannot be had from the potteries. The ſhape of the veſſels ſhould be broad and ſhallow: this anſwers two purpoſes: it makes the milk yield the largeſt quantity of cream, and it keeps it the longeſt from ſouring. A quantity of milk under the ſame circumſtances otherwiſe, will always ſour the ſooner, the deeper it lies together in the veſſel.

CHAP. XI.

Of ſetting the milk for cream.

THE dairy is now ready for the milk, and that is coming home in pails upon the ſhoulders of the milkers, the veſſels in which it is to be ſet are placed ready to receive it; but there is one thing to be conſidered previouſly to its being put into them. We have taken care there be no dirt in the dairy, let us uſe the ſame precaution that none come into it from the field. Too much cleanlineſs can never be recommended to the milk-maids, but let them take what care they will, they can never keep their pails perfectly free from accidental foulneſſes. The hairs from the cow will fall into them, and other little matters of the ſame kind may alſo. All theſe, however they are blended among the milk, wonld riſe with the cream, and not only diſgrace the houſewife, but diſturb all the operations that are to follow; for we have ſhewn that the leaſt filth will perplex and teaze the whole management.

To prevent accidents of this kind the milk is to be ſtrained; and this is to be done in a very eaſy and familiar manner, by means of what the houſewife calls her ſoiling diſh, or as they commonly ſpeak it the ſyle diſh. This is a wooden bowl, with its bottom cut out, and the opening covered with a piece of fine clean linnen cloth. This bowl muſt be every day ſcalded, and ſet out in the air to ſweeten like the reſt, and care muſt be taken that the cloth be always perfectly clean. Through this diſh the milk is to run into the ſeveral veſſels prepared to receive it, and then it will be perfectly clean and pure, for the hollow'd bottom will ſtop the ſmalleſt ſolid particle, and thus nothing but the milk can get into the veſſels.

Thus far then our houſewife has provided with care and regularity,

gularity, her milk is pure, and is in veſſels perfectly clean: there is no danger of any injury to it, and 'tis now to be left to nature. The dairy is cool, clean, and quiet, this is all that is needful to promote the gathering of the cream: properly ſpeaking nothing can be done to promote this, for it is a natural procedure, and muſt go on in its own way, all that can be done is to prevent dirt, heat, or diſturbance; and this we have contrived in the ſtructure of the place. The milk is compoſed of different parts: theſe are kept mixed while it is in the body of the animal, but they ſeparate one from another ſoon after they are out: this is that ſeparation which prepares for the operations of the dairy. The rich and fatty part comes from the poor and watery; that is, the cream riſes to the top, and leaves the thin part at bottom. The broader and ſhallower the veſſel is, the more freely, eaſily, and readily this ſeparation is made: that is, the ſooner the cream gets to the top, and the greater quantity there will be of it, theſe are the two great points the houſewife deſires.

CHAP. XII.

Of ſkimming the cream.

WE are ſenſible how lightly many of thoſe things are in general looked upon, that here make the ſubject of diſtinct chapters, but it is to that want of conſideration of what are called trifles, half the diſappointments and loſſes in a dairy happen. Every houſewife knows when her cream is riſen, ſhe is to ſkim it off: that is true, we do not take up her time in telling her that ſhe is to do it, but we are about to acquaint her how ſhe ſhall do it to the greateſt advantage; and from what we have ſeen of dairies in ſome parts of this kingdom, no information relating to the farm is more neceſſary. We have recommended cleanlineſs in every article, but here we are to repeat that leſſon. There is nothing that requires more nicety than the ſkimming off the cream, nor any article in which a little dirt can do ſo much damage.

We will ſuppoſe the milk to have been brought in in the morning, according to our directions for the ſummer milking, about ſeven o'clock; toward afternoon let the ſkimming diſh be cleaned and got ready, and alſo the veſſels that are to receive the cream. The ſkimming diſh ſhould be of a convenient ſize for the hand, not too deep; and thin at the edges. The time that milk ſhould ſtand is a point in which few are agreed, and about which moſt err. In ſummer ten hours is in general enough for milk to ſtand. Therefore this milk having been brought in at ſeven in the morning, will be ready to ſkim at five in the afternoon; and this will be a very convenient time to the houſewife, becauſe what ſhe is now doing will prepare for the evening milking.

Many let their milk ſtand longer in ſummer, and accordingly vary according to the circumſtances at other times, but by what I have found from repeated experience, there is no rule ſo proper. 'Tis a nice point, and of great importance, either way an exceſs or defect may be of much damage; if the milk be ſkimmed too ſoon the houſewife has not her full quantity of cream; and if it ſtand too long the butter will ſuffer. When milk ſtands too long without ſkimming, the cream gets a thick head, and is untractable, and the butter that is made of this is always bitter. I have known this in inſtances out of number, and when I have convinced ſome houſewives that it was owing to letting the milk ſtand too long, they have tried every method that could be thought of to prevent the effect, but in vain: I have known them boil the cream that was thus taken from milk which had ſtood too long, in order to prevent this ill taſte in the butter, but to no purpoſe.

What all the pains and care imaginable cannot remedy in this, as in many other caſes, may eaſily be prevented, and that is the leſſon which we give to the houſewife. Prevent the damage by ſkimming in time. Let the milk be all ſkimmed at five o'clock in the afternoon, and let the cream be put into a proper veſſel. The beſt is an earthen pot well leaded, with a cover. When it is put into this, let it be ſet by in a cloſe cool place. An hour or more has been employed in this, and in cleaning the neceſſary veſſels, and by that time they are got in again and ſet in order 'tis ſeven o'clock, and the milkmaids come in loaded from the evening's milking. This milk is to be ſtrained and managed exactly in the ſame manner as the firſt, ſo there needs no particular direction on that head; and we ſhall, to avoid repetition, ſuppoſe the ſame buſineſs gone thro', and the milk all ſet as the firſt.

The houſewife may now be quiet for the night, but let her take care to be up early in the morning. The next article to cleanlineſs is early riſing; and it is need ſhe be up, for the milk ſhe has ſet over night will be ready for ſkimming after ten hours, or half an hour more, that is, by five, or ſoon after five in the morning. In general it will be beſt to allow half an hour longer ſtanding during the night than in the day, becauſe the night is cooler; and experience ſhews that the warmth of the air has a great deal of effect in the throwing up of cream. In this manner the cream will be taken off from the evening's milk; and all got ready for the reception of that of the morning, by that time the milkmaids come home with it: and thus the whole round of that important article; the obtaining, ſetting, and ſkimming the milk, will be managed without the leaſt trouble or perplexity.

CHAP. XIII.

Of the management of the cream.

WE left our houſewife with her pots of cream, and her dairy work going on with due regularity, we muſt proceed to adviſe her how to manage the produce in the beſt and moſt ſatisfactory manner. There is need of great caution, and that for the plaineſt reaſon in the world, which is, that convenience would naturally preſcribe the keeping it longer than it is found in effect ſafe or proper to do. The weather makes a great variation in this article, and we are to obſerve alſo, that there are artificial ways of aſſiſting nature in preſerving it. However, as pure ſweet cream, in its natural condition, is preferable to the beſt that is preſerved in whatever manner by art, we ſhall firſt give the houſewife her leſſon how long ſhe ſhould, and how long ſhe may keep it naturally; and afterwards inform her what may be done in the keeping it longer by art and management.

The fineſt and moſt excellent butter is that which is made from cream that has not ſtood above ten hours in the ſummer; but in winter it may be kept much longer without damage. When we name ten hours, it is by way of limiting the ſpace in which it is quite perfect; for butter that is made from cream ten hours old, or from ſuch as is juſt ſkimmed, is altogether the ſame. After this, in ſummer it begins to ſuffer ſome change, but it is little for the two ſucceeding days, only in general the newer it is the better.

The ſeaſon makes ſo great a variation, that cream may be kept very well twice as long in winter as in ſummer. In ſummer it may be kept without any material diſadvantage two days and a half; and in winter it may be kept in the ſame condition five days. The houſewife who intends to have credit in her butter, if ſhe takes care not to let the milk ſtand too long before it is ſkimmed, may very well keep it thus long without any particular management; but if ſhe intends to have more of it together than can be got from her ſtock of cows in that time, or to churn only at certain times, which require the cream to be kept longer, then ſhe muſt uſe ſome art to preſerve it. It may be neceſſary to obſerve, that in making butter for ſale in large quantities, there is no objection to the cream being kept longer. In this caſe it turns ſour; but the butter is not the worſe for market, unleſs it have been over-heated or otherwiſe ill managed in the churn. The fine butter for preſent uſe ſhould always be made of perfectly freſh cream; but for this marketable commodity the other is rather preferable; for experience ſhews that butter made otherwiſe under the ſame advantages, keeps better when the cream has ſtood to be ſour, than when it was perfectly freſh; unleſs it turn bitter: this, in butter made from cream that has been kept till ſour, is always a mark of its tending to decay; wherefore in that caſe, the ſooner it is uſed the better. The fine flavour depends on the freſhneſs of the cream, but otherwiſe the butter is not the worſe for ſome keeping. The days of market often regulate the days of churning: there is ſome convenience in doing a good deal of buſineſs at once, and when there is but one market near, and that but one day in the week, which in the country in many places is no uncommon thing, it will be a great convenience to the houſewife if ſhe can contrive to churn but once in the week, and to prepare all together. We ſhall ſuppoſe this the caſe, as it is a very common one, and lay down a method by which ſhe may in ſummer be able to keep her cream the whole week without its growing ſour, though in the common courſe of things it would be ſo in three days. We will ſuppoſe the market day Thurſday: then Friday may be called with her the beginning of a new week; but as her cream will have been gathering ſooner, we ſhall trace it from that time.

In order to prepare for the market on Thurſday, ſhe has been churning on Wedneſday, and ſhe will have taken into her churn the cream of Wedneſday morning, that is, what was ſkimmed from the milking of Tueſday evening; the laſt that can go into the account of that week. The Wedneſday morning's milking is ſet for cream, and this is the firſt parcel for the ſucceeding week: to this is to be added all that follows till the Wedneſday morning again, which ſhe is to preſerve for the churn on that day. Let every ſucceeding ſkimming be mixed with this firſt, and on Saturday morning let her ſet all the cream ſhe has got over the fire, and let it juſt once boil: this done let her put it back into a clean pan, and then add to it all that is taken off the milk during the following part of the week, but let her every day change the veſſel in which it is kept, pouring it daily into a freſh one well cleaned and aired. It is very ſtrange to ſee the effect of this, the boiled cream not only keeps good itſelf, but by the practice of every day putting into a freſh and perfectly clean veſſel, it preſerves all the reſt from being ſour. This has been frequently tried in the neighbourhood where I now live, and when it has been done with due care has always ſucceeded.

CHAP. XIV.

Of butter.

BUTTER is the oily or fatty part of the milk, which firſt ſeparates of itſelf in form of cream, and after that needs but little art to bring it into the condition of an elegant, ſolid, yet ſoft ſubſtance, pleaſant to the taſte, and fitted for many purpoſes. When we ſee butter in this light, of a thing ſo deſirable, and ſo eaſily obtained, it appears wonderful that the knowledge of it came ſo late into the world; but 'tis certain that there were very many ages in which it was not known; and many countries in which it was not uſed in food long after the reſt of the world were perfectly acquainted with it.

The Greek poets and philoſophers frequently mention cheeſe, and yet the name of butter is not found in their writings. It is certain the only uſe they made of milk in thoſe times was to drink it alone, to eat it with mixtures, or make it into cheeſe; for not only they are ſilent on the making butter, but it is evident from the whole tenour of their writings, there was no ſuch thing in uſe among them. Ariſtotle has written largely of milk and its products, but among theſe there is not a word of butter; he only treats of cheeſe of ſeveral kinds, and the whey, of which there were alſo ſeveral ſorts, according to the manner of making the cheeſe. The Romans made butter; but what is yet more ſtrange than the former, they, though they had it, never conſidered it as an article of food; they uſed it as a medicine; and we read their ſentiments concerning it in Pliny, where we find they were well acquainted with its uſe in other countries. It is very well known that the people of the Eaſt-Indies knew nothing of butter, till the Dutch took it over to them.

We ſee in this an inſtance of a very great truth, which is, that the moſt familiar things may be a long time overlooked, and that what every man wonders he did not find out himſelf, millions beſide may have left all their days undiſcovered. Butter is made from cream by the aſſiſtance only of motion: this may be given it any way, and provided it be in a proper degree, the effect will be produced. This motion in the common way of performing it is called churning; and the uncertainty of that has led the ingenious to contrive many methods of ſupplying the place of beating by the repeated labour of the hand; ſome of theſe are much worſe than the old plain way, and there are others that really deſerve the name of improvements.

There are certain particularities relating to butter, much better known than underſtood; it will be very well worth while for thoſe why have the convenience of being upon the ſpot, to endeavour to diſcover the reaſons. In the mean time all we can do is to mention the facts. Suffolk butter is famous for keeping, which is a quality of ſo much importance, that every method is to be taken in hope of finding the cauſe of it. There are methods of making any butter keep longer than may at firſt be imagined practicable: if good butter be made up in lumps of forty pounds weight, and a little more ſalt be put in than is uſually allowed, and they be afterwards put into a large bin of flour, they will keep the year round without damage.

Toward the end of autumn butter is apt to taſte bitter. This is one of thoſe things better known than its cauſe; it has been ſaid that the reaſon is, that graſs beginning to grow bare at that time, the cows eat the leaves that fall from the trees; but however true it may be that cows will feed in this manner, it is not true that this is the cauſe of the butter's being bitter: becauſe in the fen countries, where there are no trees, and where ditches ſerve inſtead of hedges, the ſame thing happens at the ſame ſeaſon. Though we cannot aſſign the cauſe of this, we can tell the houſewife how to prevent the damage, which is enough for uſe, if not for curioſity. There needs no more than to ſkim the cream after a ſhorter time ſtanding. We have obſerved before, that when milk ſtands too long the cream hardens on the top of it, and the butter made from ſuch cream is bitter; this ſhews that too long ſtanding alone may be a cauſe of bitterneſs in the butter, and for that reaſon, where there is danger of the ſame accident from any other cauſe, one would take care to prevent this from joining to make it worſe; on this principle has been founded the practice of ſkimming milk earlier at that ſeaſon of the year; and the conſequence has ſhewn that this alone will prevent the bitterneſs of the butter, whatever elſe was the cauſe that would have made it ſo.

In Devonſhire they make a kind of butter, which is called ſcalded butter. The advantage is not only its being particularly well taſted, but that it will keep a month without damage. The way they raiſe their cream for this purpoſe is the ſame the chemiſts uſe when they have a mind to give any thing a gentle heat, without burning it to the veſſels, and which they call a Balneum Mariæ. They ſtrain the milk into veſſels, and ſet it by for the cream to riſe. Ten hours afterwards, when the cream is riſen in the common way, they ſet the veſſel with the cream, milk and all, over ſome water in another veſſel, ſo that the water reaches half way up that wherein the cream is: this done they ſet the veſſel of water over a ſtove, and gently heat it till the cream is thoroughly and perfectly riſen, and the milk underneath is quite thin and blue. The gradual and ſoft heat does this, and at the ſame time doing it a great deal of ſervice, for the article of keeping by the heat. The cream is ſkimmed off with a ſkimming diſh full of holes, and the blue milk is let to run perfectly away from it. This is a kind of clouted cream: the fire ſo gently conveyed to it has done great ſervice; and it may be kept with proper care ſeveral days, ſo that enough of it may eaſily be got together for churning. All that is needful for preſerving it during this time, is ſhifting it once in four and twenty hours into a freſh and clean veſſel.

CHAP. XV.

Of churning.

WE will now ſuppoſe the time arrived when convenience calls for the making the butter. We ſhall conſider firſt the common way of making it with the old faſhioned and long uſed churn. This is a veſſel of wood, tall and deep, wideſt at the bottom and narrower to the top, where it has a cover that falls in cloſe, and has a hole in its middle. Through this hole is let the handle of the inſtrument, wherewith the cream is to be beat; this conſiſts only of that handle, and a round board, like a broad thick trencher at the bottom, in ſize ſuited to the middle of the churn. When this is put in, the handle is let through the hole of the cover, and that is then put on and faſtened down. This is the whole contrivance: all that is required for making butter is well beating of the cream. And it is very well done by this inſtrument; for the cream being in the churn, the working of the handle up and down in the hole of the lid naturally agitates and beats the whole, and the faſtening of the cover prevents its riſing out. This churn is to be made clean with all poſſible care, by thoroughly waſhing and ſcalding, and then expoſing it to the air to ſweeten and purify. When every part of it is thus cleaned, it is to be brought into a proper part of the dairy, and this differs according to the ſeaſon, for which reaſon there can be no particular fixed place for its ſtanding.

All niceties are to be obſerved in churning, for it is a very precarious article; and often when all the care poſſible is uſed, the work goes on very vexatiouſly, and the butter will not, as they expreſs it, of a long time, come. A moderate temperature of the air is the moſt favourable for the working of butter; wherefore, according to the ſeaſon of the year, this muſt be helped by the place of the churn. In every dairy there are ſome places warmer and ſome cooler than others. In winter the churn muſt be ſet in the warmeſt place; and in ſummer it muſt ſtand in the cooleſt. In the ſame manner the time of churning muſt be varied according to the weather. In the heat of ſummer, the air being naturally too hot for the making of butter, no hours are proper but either very early in the morning, or very late in the evening: on the other hand, as the air is too chill and cold in winter, the middle of the day, and no other time is to be taken.

The hour and the place of the churn being fixed, the houſewife is to go to work. She is firſt to ſtretch a coarſe, ſtrong, and very clean cloth acroſs the top of her churn, and into this to pour the cream. When the cream is ſtrained and preſſed through this cloth, the churn is to be covered in, and the maid is to go to work. There is great uncertainty as to the time of the butter coming, but this depends upon the manner of beating: a heavy, tedious, dull beating gives the cream time to gather again between ſtroke and ſtroke, when it was about to break; and, on the contrary, the ſwifteſt work does the moſt buſineſs. Let the miſtreſs firſt examine the manner of working of thoſe who complain, ſhe will commonly find lazineſs is the devil in the churn, that ſets his ſpell upon the butter. Let her overſee the work at firſt, and ſee it is done briſkly, with ſwift ſharp ſtrokes, and tell the people, for their own ſakes, to continue it in the ſame manner. She will know by the ſound how the work goes on. At firſt the noiſe is deep and heavy; but after a time it will begin to be ſhriller and ſharper. This is a proof the cream begins to ſeparate from the thinner part, or as they commonly expreſs it, that the butter comes: the work is to be continued with the ſame ſpirit and earneſtneſs, and the effect will ſoon follow. The ſtaff will be perceived to work lighter; and ſoon after this, upon opening the churn, and examining the top of the lid on the inſide, there will be found drops ſticking to it that look yellow. The butter is now coming, and there will ſoon be an end of the labour, for theſe drops are abſolute butter, and when the change is thus perfect in one part, it will not be long before it is ſo throughout; after a few ſtrokes more let the churn be again opened, and there will be found butter on the ſides as well as lid, and every where, ſo far as the ſplaſhing can reach.

The butter is now made, and is only to be got together. For this purpoſe the lid and inſide of the churn muſt be ſcraped clean, and the butter, which is got off from them, muſt be put down among the reſt into the body of the churn; then all is to be covered up again, and the work continued, but not with hard downright blows, but with a kind of ſlight rounding ſtrokes; for all that is to be done now is to get the butter together into a lump. When this is done it is finiſhed, and is to be taken out of the churn. This is the general method; and theſe are the cautions always to be obſerved: but we ſhall now enter upon thoſe particulars which promote or retard the formation of the butter in the churn; that the houſewife being aware of what will prevent her ſucceſs, may guard againſt it; and knowing what will forward it, may purſue it.

Over hot weather not only makes churning difficult, but the butter, when it is made, is ſo far influenced by the weather, unleſs properly guarded againſt, that it is whitiſh, brittle, and bitter; we have ſhewn how to avoid theſe accidents, by taking an early or late hour, and a cool place. The early hour is better than the late, for the air is cooler in the morning before the ſun riſes, than it can be in the evening, after it is ſet, becauſe in one caſe it has been heated all the day, and in the other it has been all the night cooling: as to the place, the hotter the ſeaſon the cooler that muſt be. I have ſeen very fine butter made at noonday in Auguſt, in an ice-houſe. Ice-houſes are not in the farmer's power, but neither need he uſe the middle of the day for churning, a cool cellar, or the deepeſt and remoteſt place in his dairy, two hours before ſunriſe in a morning, will be equal in coldneſs to the ice-houſe at the middle of the day. In the coldeſt time of winter it is often very difficult to make the butter; and I have ſeen ſo much of this, that I think the experiment I ſaw tried in the ice-houſe could not have ſucceeded as it did, were it not that the cream when carried in had a great deal of heat in it from the common temper of the air, and the butter came before the extream cold of the place had any great effect upon it.

C H A P. XVI.

Particular rules relating to churning.

IN ſummer, as the heat of the air is the occaſion of the difficulty, the houſewife muſt take all poſſible means to prevent adding to the natural heat of her cream, and to cool it gradually. We have adviſed very briſk working of the ſtaff in general, but here muſt be a kind of exception, for too much motion will occaſion heat; and therefore in extream ſultry times it will be better to manage the blows accordingly, making every blow ſmart and ſure, but not repeating them ſo quick upon one another. There is ſome myſtery and art in churning at any time, but it is at this ſeaſon that the main difficulty occurs; and if it be not managed according to theſe directions, there will be a great deal of perplexity and trouble.

Let the houſewife take care that ſhe does not add to the weather, by any heat in the churn itſelf; and farther, let her abate the heat when it is naturally ſo much that nothing can be done by cooling it. As her churn is to be ſcalded in order to make it perfectly clean and ſweet for the uſe, let her take care that it be thoroughly cooled, before ſhe puts her cream into it. Scalding water gives a great deal of heat, and wood keeps it a long time: therefore let the ſcalding of the churn be the firſt thing done in the preparation for the work, and let the churn be thoroughly examined by the hand half an hour at leaſt before it is uſed, that it may be cool. Wood will retain heat when the hand does not feel it, but half an hour's cooling, after no more is perceived, will ſet it right. To add to this in very hot weather, it will be well to wet the outſide of the churn with pump water freſh pumped, a little before the putting in the cream; but the inſide muſt not be wetted ſo near the time.

Under theſe cautions, there is reaſon to hope the butter may come without much difficulty; but if, after a moderate time, there be no appearance of it, let a waſhing tub be a third part filled with freſh pumped water, and brought to the place where the maid is churning; let the churn be placed in this, and if the water do not reach as high up the outſide of it as the cream riſes within, then let more be added till it does: let the work be now carefully continued, and commonly, as ſoon as the effect of the water is felt through the wood, the butter will begin to come. It is not only that the cream is thus brought to that condition in which the butter comes beſt, but the ſudden change is of great aſſiſtance: the ſame effect that the cold air of the ice-houſe in the before-mentioned experiment had upon the cream, the ſudden chillneſs of the water ſhews in this caſe; and as a conſiderable change is to be made in the thing itſelf, for the difference is really great between butter and cream, this quick ſhock, better than any other ways, brings it about.

Theſe are the little particulars by which the houſewife will be able to aſſiſt herſelf, in caſes when the too great heat of the weather prevents her ſucceſs; on the contrary, when her difficulties are owing to too cold an air, ſhe muſt, in the ſame manner, aſſiſt nature by giving a little warmth. We have adviſed her, in the other caſe, to be very careful the churn be cool from the ſcalding, but in this ſhe will do well to examine the veſſel how it cools by degrees, and to ſtrain in her cream while there is yet ſome warmth remains in the churn. This will give a little help to the cream; and the maid muſt be ordered to work it more briſkly than ordinary; the coldneſs of the weather uſually puts her in mind of this, and the leſs admonition is needful. If with this aſſiſtance the butter do not come, let the churn be taken into the kitchen, and placed not within the reach of the fire directly, but in the air of it, this will by degrees bring the cream to the due temper. Then the work of churning is to be continued briſkly, and it will not be long before there comes good butter. There is more trouble in getting butter in very cold weather, than at any other time, but by theſe aſſiſtances it will be greatly alleviated; and there is nothing in all this that will be at all prejudicial to the taſte or colour.

CHAP. XVII.

Of the waſhing and making up of butter.

THE butter being formed in the churn, and worked together into one large lump, is to be taken out and finiſhed in the hands. Butter, when thus made in the churn, is far from its perfection. It is ſeparated from the watery part in ſome degree, but not entirely. The whole operation depends upon this, that as in milk there was a richer part and a poorer, which being ſeparated by ſtanding; ſo in the cream there are two ſeparate ſubſtances, an oily, which is the butter, and a watery, which is the buttermilk. The ſeparating of theſe is what we call making of butter.

This ſeparation is performed by agitating of cream in a due degree of heat, and this being done perfectly the butter is perfectly made. The churn does this but imperfectly, being a clumſy and unweildy inſtrument; but it makes a good beginning, and the hand is afterwards very well able to finiſh it. The finiſhing conſiſts in two articles, the perfectly ſeparating the buttermilk, or thin part, and the cleanſing the butter from any accidental foulneſſes. The lump of butter is to be taken up with both hands, and removed out of the liquor. In this there comes a conſideration, which is only to be determined by the time the butter is intended to be kept: if it be made for immediate uſe it is to be thrown into water immediately, on taking it out of the churn, if otherwiſe not. Whichever be the caſe, let a very clean pan of earthen ware glazed, be ſet ready by the churn: if the butter be deſigned for uſe immediately, let this be half full of clean freſh water; if not let it be empty.

The lump of butter being lifted out of the churn muſt be put into this pan, and there worked thoroughly to and fro in the water, or without, labouring it with both hands, and moving it frequently about; by this means the buttermilk that remained in it will be thoroughly waſhed out, and the butter will be pure and of a firm and good conſiſtence: the well working, turning, and toſſing the lump, is a very material article, for to that alone the butter owes its purity, its good conſiſtence, and in a great meaſure its colour. I have ſeen butter that looked white and chalky, on taking out of the churn get a very good pale ſtraw colour, in the frequent and repeated working in the hands among water. The buttermilk being thus ſeparated, one of the two points intended is obtained; the other is the perfectly cleaning of it.

So much care as we have adviſed, one would think, would keep out dirt from the butter, but it does not always happen: a rag of the ſtraining cloth, a hair, or ſome other impurity, may eſcape the obſervation; and any thing, the leaſt imaginable in this kind, may damage the butter in the reſpect of ſale, and will always be a blemiſh in the houſewife's character. The working the lump in the hand may diſcover ſome foulneſs of this kind, which muſt be picked out as ſoon as ſeen; but leſt any ſhould have eſcaped the eye, the whole muſt now be taken out of the water, and cut croſs and croſs many times with a knife, till every part of it have had the knife in it, this will find out any little thread or hair, and thus it is to be made entirely clean.

The laſt thing to be done is the ſalting. We are not here ſpeaking of the ſalting that is to prepare butter for long keeping, but juſt of that which is done to give it a reliſh. Butter is very inſipid when it is made up entirely without ſalt, ſo that the freſheſt ſhould always have ſome. The butter is to be ſpread out thin with the hand, in the bottom of a broad ſhallow diſh; and then a very little ſalt is to be ſprinkled carefully over it, the deſign being to mix it as equally as poſſible in the whole quantity; it is then to be worked up well in the hands, and it is done: it may be wrought up into rolls, lumps, or diſhes, or formed in any ſhape more ſaleable at market, or moſt convenient in the family.

Having thus gone through the whole work of making butter, we ſhall proceed to the ſalting of it, that being a very eſſential part in the farmer's traffick in ſome places. But here, as we have named only the plain good old family way of churning, it may not be amiſs to obſerve that there are others which have their uſe. The ſweep is a kind of churn which works in the manner of a pump, and is uſed with a great deal of eaſe and advantage in many places: in other parts of England they prefer the barrel churn, and it alſo anſwers very well; theſe inſtruments are to be had at the turners, therefore I ſhall ſay no more of them here, as I ſhall not take upon me to recommend them, though I allow they are good in their kinds; the other always, ſo far as I have ſeen, very well anſwering its purpoſe. The greateſt preference that is made for uſing theſe, is the quantity they can manage, and the expedition of the work; but I have ſeen twenty gallons of cream wrought at once in a common churn big enough to hold thirty; and this quantity brought to butter in about an hour. When the quantity is ſo large, a woman alone is not able to manage it, but a man and maid do it perfectly well.

In hot weather butter, though very well made, will ſometimes continue too ſoft; and this will be a great diſadvantage in reſpect of the carriage to market, and ſometimes hurts the ſale. The remedy is eaſy. Let the butter, when it is thoroughly made, and properly ſalted, be rolled into lumps, pounds, or half pounds, according to the demand, and put carefully into a baſket: let a long rope be faſtened to the handle of this baſket, and let it be let down into a well till it come within two foot of the water. In this way let it hang all night, taking care no accident happen to it by thieves or careleſſneſs of ſervants, and in the morning let it be drawn up and ſent to market. The cold air that lies juſt above the water in the well, will have the ſame effect as the natural cold of winter, and it will be as hard as butter commonly is in November. With reſpect to the ſalting of freſh butter, the particular fancy, and taſte, and cuſtom of the country, are to be ſo far conſidered, that it is very difficult to eſtabliſh any general rule; but in a moderate way we may ſay, a pint of ſalt will ſerve for twenty pounds of butter; ſome go as far as a pint and half for that quantity, but 'tis too much, for only the flavour of the ſalt is wanted, to take off the inſipidity of the butter: therefore the leaſt that will do is beſt; thoſe who go much under a pint to twenty pounds do not anſwer their purpoſe, for the ſalt is not taſted when ſo little.

CHAP. XVIII.

Of the making of butter from new milk.

AMONG the improvements that have been made in huſbandry of late ages, this may be very juſtly reckoned one, for in large concerns it ſhortens the trouble of a dairy very much. As we have given the rationale of butter making in the preceding chapter, there will not appear any thing ſtrange or wonderful in the attempt, or in the ſucceſs of making butter without the trouble of firſt ſetting the milk for cream. When milk ſtands an oily part ſeparates, mixed with ſome water, this is cream, which conſiſts of butter the oily part, and buttermilk the watery. This is afterwards beat, that by means of the motion the remaining watery part may be ſeparated from the pure and oily. This oily part, which is wanted for butter, is originally in the milk; and there is no reaſon to wonder that beating, which in the common way of working, drives out the watery part, and ſeparates the oily from the cream, may in a greater degree, ſeparate this oily part at once from the milk.

This is the principle upon which they proceeded, who firſt ſet up the ſcheme of new milk butter, and it anſwered accordingly. It is for this uſe that machines, and other contrivances, are to be called in to the aſſiſtance of the farmer; the quantity of milk not reduced to cream being too great for the churn; and the labour required is ſo much greater than is needful for cream, that no human creature could be expected to go through it. Therefore it has been properly contrived for this purpoſe, that the veſſels ſhall be very large, and eaſily put into a violent motion; and that the work ſhall be performed by a horſe. In ſome places they uſe an implement not unlike a common churn for this work, but it does not do near ſo well as thoſe barrels that run round, with ſtops in them for that purpoſe.

The farmer who has a mind to fall into this way, may eaſily get the machine, the ſtructure of it being ſufficiently underſtood among the mechanicks in moſt parts of England; bur he may, by freſh contrivances, ſave himſelf a great deal of labour and trouble: he may fix his milking place in ſuch a manner, that the milk may come directly from the cows, through a pipe, into the veſſel; which, when the milking is over, may be ſet in motion, and at once make the butter.

As we have named the benefit of this method, which is for the managing a great quantity of milk with little trouble; it will be proper we fairly ſet before the farmer alſo its inconveniences. The principal is, that the butter made this way, though very good for preſent uſe, is not found to keep ſo well as that made in the common method. The buttermilk made this way ſupplies a tolerable kind of cheeſe with little trouble: they let it out into other veſſels, and then add runnet, and it comes to a curd very readily.

CHAP. XIX.

Of ſalting of butter.

IT is often neceſſary, and is always profitable to ſalt butter at certain ſeaſons: but there are times of the year more proper than others. The butter of the early part of ſummer is not ſo proper for ſalting; and that of no time is ſo good as what is made from the middle of Auguſt to the end of October.

ber. The firſt difference that is to be obſerved in the making, is when it is taken out of the churn. We have ordered freſh butter, that is, ſuch as is intended to be kept freſh, to be put into a pan of water, and there worked with the hands to get out the buttermilk, but in the butter intended for ſalting no water muſt be uſed. 'Tis to be put out of the churn into an empty pan, and there worked between the hands, to ſqueeze out the remainder of the watery part.

This done the butter is to be mixed with ſalt, which is to be worked in with the hands; the more the better: the way is to ſpread out the butter as in mixing that ſmall quantity of ſalt with ſuch as is intended for immediate uſe; but inſtead of that, as much as can be got in is to be added here, and when the whole is well mixed, the butter thus prepared is to be put up in pots or barrels. For large quantities barrels are needful, but for leſſer pots are more proper; but they muſt be well glazed, otherwiſe the brine will eat into them. In pots it is proper to lay in a thin bed of ſalt before the butter is put in, and when it is put up then to lay another ſuch bed of ſalt over the top of it. In many places where they barrel up large quantities, they pierce holes through with a ſtick, quite from the top to the bottom of the barrel, and making a very ſtrong brine, they pour in a quantity of it over the butter, and let it run down all theſe holes. Some, inſtead of a bed of ſalt upon the butter when they have potted it, pour over it a quantity of ſtrong brine, and this is no bad method.

Though the butter muſt not be waſhed when taken out of the churn, yet a great deal depends upon the getting the whey well out, which can only be done by thorough working it in the hands; and this is the more material, becauſe otherwiſe it would diſſolve and carry away a great part of that ſalt which was uſed in preparing it, ſo that it would fail.

As to the quantity of butter to be expected in proportion to the number of cows, accidents will make a great difference; but in the butter countries they generally account they may, one year with another, expect from ten cows a firkin and half of butter in a week, in ſummer; and a firkin in winter. The difference of feeding makes a great variation in the goodneſs of the butter, and none is worſe than ſuch as is made when the food is between wet and dry, as is the caſe in the beginning of ſpring and latter end of autumn, the food being at thoſe times between graſs and hay, and that irregularity having a great effect to the diſadvantage of the milk.

There are two ways of making ſalt butter freſh, when there is occaſion for it; and it is poſſible, by ſalting up the butter in the cheap times, and freſhening it when dearer, to make ſome advantage. The method for the ſervice of a family is by beating it up with new milk; but when it is done for the market, the way is to cut it into thin ſlices, and put it into the churn where cream is beating for freſh butter. A good quantity may be added in this manner, but there is an art in juſt hitting the time. It muſt be put in when the other butter begins to come, otherwiſe it will pervert and diſturb the operation; but in this manner it goes on very well with the reſt, and if not too long kept, will, on being waſhed with the reſt, paſs with it as very good freſh butter, not at all debaſing the price.

CHAP. XX.

Of whey butter.

WHEY butter is little known in London, but 'tis often made in the country, for the ſervice of farmers families. It is like other butter, but poor and rank; and is made from a cream got out of whey, as the other is from the cream of new milk. A kind of ordinary cheeſe is made from the butter-milk, when new milk is churned for butter inſtead of cream; and in the ſame manner a poor kind of butter is made from the whey of curds made from new milk for cheeſe. This depends upon the ſame principle, which we laid down in the account of milk. This is that there are in it three diſtinct ſubſtances, an oily, a curdy, and a watery part: now by whatever method any one of the two firſt are ſeparated, the other will always, more or leſs, remain. This is the whole matter. When new milk is wrought for the butter, the curdy part is left behind, and the addition of rennet makes a kind of cheeſe; and when rennet is at firſt added to new milk, the curdy part only is ſeparated, the oily part remaining, in ſome degree, in the whey; and this oily part being afterwards ſeparated from the whey, makes the butter called whey butter. When curds have been made from new milk, the whey is to be ſet in large pans, in a quiet part of the dairy, for cream; there will riſe a cream upon this, though not like that from new milk, and it is to be ſkimmed off and churned in the ſame manner.

In ſome places they enrich the butter by adding a fourth part of new milk cream; theſe, in any proportion, mix very well together, and the butter is the better as the more of the new milk cream is uſed. Beſide the inferior quality of the whey butter, its quantity in proportion to the cream, is but ſmall. The ſame meaſure of whey cream yielding but about half as much butter as the other: neither will the whey butter ever come to a good conſiſtence, nor will it keep; ſo that it is a very poor matter: however, it may be worth the farmer's while, in many caſes, to make it.

CHAP. XXI.

A method of taking off the ill taſte of milk.

HOWEVER uncertain we remain, as to the cauſe of the ill taſte milk has at certain times, yet the effect is conſtant, and is very prejudicial to the farmer; the taſte being communicated to the butter, and reducing its price. To the methods we have laid down for the preventing this evil, we ſhall add a new and very particular one, the invention of doctor Hales, an author not more diſtinguiſhed by his genius, than by the conſtant application of it for the publick good. We have had the method propoſed by the gentleman, tried, and have found it anſwer ſo well that we ſhall not ſcruple to aſſure the farmer, it is not more ſingular than ſucceſsful. The inſtrument is very eaſily made, and of ſmall expence, and the uſe very familiar.

A round tin box is to be made, of ſix inches diameter, and two inches in depth: the lid of this box is to be pierced full of holes, they ſhould be about a quarter of an inch diſtant from one another, and a twentieth of an inch in diameter. A tin nozzel is to be ſoldered into the middle of the lid, and to riſe to ſome height above the ſurface, ſo as to receive ſecurely the end of a long tin pipe, through which the air is to be conveyed into the box; through the holes of which it is to be blown up again through the milk; this tin box being placed at the bottom of the veſſel. The tin pipe that goes into this nozzle is to be a little more than half an inch in diameter, and two foot or more in length, according to the depth of the veſſel. To the top of this ſtrait pipe is to be jointed and ſoldered on another at right angles. This ſhould be of the ſame bigneſs with the other, but it need not be more than ſix inches in length. To the end of this that is free, a leather nozzle or ſhort pipe is to be fixed, and then the whole is compleated. The cover or lid is beſt made deeper than the box, and ſcallop'd in the part that goes in; this lets the air holes have free paſſage, and there is to be a row of them on the upper edge, where it is not received into the box.

Every tinman will be able to make this inſtrument, and the moſt ignorant ſervant may be inſtructed to uſe it: the principle whereon its benefit depends is this. The ill taſte of milk is ſo lightly mixed with it, that it may in a great part be carried off, by blowing a quantity of air in diſperſed particles through it; and this may be done very conveniently by the inſtrument now deſcribed.

The tin box is to be placed in the middle of a large veſſel, into which the milk is to be poured as it comes from the cow. The tin pipe is to be put into the nozzle, and when this is well fixed the milk is to be poured in. Then, the box being kept firmly at the bottom, the noſe of a pair of common bellows is to be put into the leather nozzle at the top, and a perſon is to blow for ſome time. The free air is thus taken in by the holes at the back of the bellows, it is forced down the pipe by the ſtrength of the blaſt, and it riſes through all the air holes in the box, and thus paſſes in ſo many ſmall ſtreams up through the milk. When the milk is but ſlightly ill taſted, it is thus to be poured into the veſſel, as it comes from the cow, and about forty minutes blowing will perfectly ſweeten it; but when it is very rank the beſt method is to make it ſcalding hot, and then pouring it in, to continue blowing till the bad taſte is perfectly gone.

This method will make at any ſeaſon perfectly fine butter out of ill taſted milk. In this laſt caſe a great deal of care muſt be taken not to burn the milk to the veſſel in heating; and it ſhould be kept warm during all the time of the blowing. The author tried it upon the milk of a cow fed with cabbage leaves for eight and forty hours; and though the milk was very ill taſted, it became perfectly ſweet in ten minutes blowing. This was an experiment with only a gallon of the milk, and it was kept hot by being ſet in hot water during the blowing. The cream produced by this had not the leaſt ill taſte.

Some caution muſt be uſed in blowing into large quantities of milk, becauſe of the abundance of froth. If the blowing be too violent, this will ſwell over the top of the veſſel, therefore it is to be managed gently. The blowing muſt not be ſo briſk, but that a perſon ſtanding by may break the bubbles, and keep the whole within bounds; it will take ſomewhat the more time the ſlower the blowing is performed, but the buſineſs will be done as effectually. Though the blowing may be performed more gently or more forceably, and the effect be the ſame in the end, the heat of the milk muſt be carefully obſerved, for otherwiſe, when the ill taſte is conſiderably great no art will get it away.

The experiment Dr. Hales tried, by feeding the cow on cabbage leaves, was a very fair one for this purpoſe; for excepting crow garlick, which the creatures ſometimes eat in the fields, there is nothing that gives the milk ſo laſting an ill taſte. A cow's milk will be made rank by cabbage leaves a week after the time of her eating them. Crow garlick gives ſo ſtrong a flavour to the milk, that no blowing will take it perfectly off when it is cold, though it abates it ſenſibly: but if the whole be kept warm for ſome time, and well blowed, the ſcent and taſte will be carried entirely away.

When milk is to be blowed, it will be proper to mix a little water with it. This water ſhould be cold in ſummer, if the milk be blowed cold; and warm in winter: but if the milk be heated in order to the perfect curing it by blowing, the water ſhould be put to it warm. It is found by experience, that the cream ſeparates better from milk for the addition of a little water in the common way of management; for it thins the whole, and by that means the cream more eaſily ſeparates itſelf. In the method of blowing it anſwers a double purpoſe, it renders the whole body of the milk thinner, ſo that the air paſſes more thoroughly and freely between its parts, and the ſurface is leſs frothy. There is one very peculiar ill taſte that milk has, this is a dead offenſive flavour, worſe than any of the rank taſtes named already: it riſes from the cow's drinking foul water. The farmer ſhould, by all means, prevent it, for it not only hurts the credit of his dairy, but endangers the health of his cattle: the ill taſte may be got rid of by this method.

All ill taſtes in cream are firſt in the milk, and the beſt way of attempting to remove them is in the ſtate of milk. In ſome places when they perceive their cream ill taſted, they heat it ſcalding hot, ſtirring it all the time it is heating, and alſo till it cools again: in other places they heat the milk before it is ſet for the cream. Both theſe have a good effect; but probably the heating of the milk will be found beſt. With reſpect to curing the ill taſte, by blowing, it muſt always be done to the milk, not the cream. The addition of water to the milk aſſiſts this operation, by thinning the body of it; and from the ſame reaſoning it muſt be more tedious, as well as more difficult, to get it out in the ſtate of thick cream.

Theſe are the reaſonings and obſervations of that excellent philoſopher, confirmed and extended by trials.

CHAP. XXII.

Of the uſe of the barrel churn.

THE beſt way of making butter with this churn is out of cream got in the uſual way. This is to be ſtrained into the barrel churn, and the advantage is, that turning upon a ſpindle the motion of this churn, if well managed, is more regular: but at the ſame time there requires a great deal more ſkill in the uſe of it. The greateſt miſtake made with this churn, is the turning it about too quick. I have ſeen butter made and unmade again many times over, by working it in this manner.

The rule is, that the turning be gentle, ſlow, and ſteady; for this ſoft motion on the ſpindle is equal to a very ſharp beating in the downright way. When this turning is done in the right manner, the butter comes quick, and very fine. It is hard, ſweet taſted, and will keep; whereas the ſingle article of too violent turning, will make the ſame cream yield a ſoft, bitter butter, that will not keep. This gentle motion muſt be kept up without interruption, from the firſt turn till the butter comes, for all goes backward upon ſtoping. When the motion has been too briſk, and the butter is near made, I have ſeen, that on ſtopping a minute only, the cream and buttermilk have mixed again almoſt as entirely as before, and the whole work was to have been done over again.

The houſewife is to ſee the barrel churn turned conſtantly, till the butter comes: ſhe needs not to open it to examine into this, for ſhe will know by the ſound: there is a particular ſquaſhing noiſe in the churn when the butter is come, quite different from what the cream made before: then ſhe is not to order the ſervant to ſtop, but only to turn more ſoftly and gently. This ſerves to finiſh the ſeparation of the buttery parts, and to bring them together into a lump: this muſt be continued half an hour, and by that time all will be perfectly done.

The butter is then to be taken out of the churn, and well worked with the hand; and the ſalt mixed with it according to the intention of ſpending it freſh, or keeping. In ſalting of butter, it is a good method to have the ſalt beat to powder: ſome have uſed baſket ſalt, becauſe of its fineneſs, but it is dear and has little taſte, in compariſon of the other. Every houſewife knows how to powder common ſalt, by firſt drying it, and this is the beſt for the uſe of butter. In churning by the barrel churn, the ſame cautions are to be uſed as in the other way, reſpecting the ſeaſon of the year and condition of the veſſels. The churn muſt be kept as carefully clean as the other: in ſummer it muſt be well cooled from the ſcalding, and in winter it ſhould be left warm.

CHAP. XXIII.

Of cheeſe.

CHEESE is made of the curdy part of milk, as butter of the oily; and according to the condition of the milk, it becomes of various kinds and prices. All cheeſe is the curdy part of milk, ſeparated from the whey: but in ſome kinds it is only the curdy part, without the buttery; and in others it is the whole mixed together, only the whey being ſeparated: there are alſo ſome kinds of cheeſe that have different proportions in this mixture. In general, as it is the curdy part of milk that gives the conſiſtence and form to cheeſe, ſo it is the creamy or buttery part mixed therewith, that gives it the mellowneſs and richneſs. The farmer's ſervants well know what cheeſe that is which is made of new milk whey, whence all the butter has been taken; and the cheeſe of Parma, and other of the Italian dairies, ſhews us how excellent a production it may be when the whole of a rich cream is mixed among the curdy part in the working.

We have ſome counties in England remarkable for good cheeſe, and others for bad: this has by ſome been laid entirely upon natural faults, as the ſoil and graſs; but it is in a greater meaſure owing to the different conduct in the dairies. A good houſewife will make good cheeſe any where. We do not mean that the milk produced by the worſt food, will yield as good cheeſe as the beſt, but when the food is the ſweeteſt, a bad manager may make bad cheeſe; and one who underſtands how to make the beſt of indifferent advantages, will make good cheeſe upon poor land. Two ways cheeſe is ſpoiled by paſturage: when the food is ſo poor that it impoveriſhes the milk, and when weeds grow in abundance, which give it an ill flavour, the principal are melilot and garlick. The remedy is eaſy, for they may be pulled up: as to the other there is no way of mending it, unleſs the farmer have better paſtures, into which he can put them; if not he muſt be content with indifferent cheeſe.

It will then be the conſideration, whether he ſhall engage in cheeſe at all: and this he muſt learn by trial of the milk, to the two different purpoſes of butter and cheeſe. There are paſtures that yield a milk fit for butter, but not cheeſe, and others that yield ſuch as is excellent for cheeſe, but unfit for butter. When the farmer ſets himſelf down upon his land, he is to conſider firſt, which is the moſt profitable manner of employing his dairy: if the paſturage be equally proper for either, let him turn his thoughts to the making that which is moſt marketable; but if it will only ſerve well for one, let him take that: cheeſe and butter are things for which there will always be a demand.

Let him examine what is the cauſe if his cheeſe be bad, and remedy it by degrees. The firſt thing is to get the worſt weeds out of his paſtures; and then let him ſet about the work of amending his land. A little expence will go a great way in the improvement of paſture grounds: and he will every day receive the fruits of his expence.

CHAP. XXIV.

Of rennet or the rennet bag.

CHEESE is the curdy part of milk ſeparated from the watery matter: milk will curdle with any acid; this curdling is the ſeparation or the gathering together of the curdy or cheeſy part ſeparate from the whey. As any acid will anſwer, the farmer has his choice of a great variety, but finding nothing agree ſo well with the milk as rennet, that is the only one he uſes. This is a natural preference, for moſt of the other acids or ſour liquors are either of mineral or vegetable origin: now rennet being an animal acid, naturally agrees better with an animal fluid, ſuch as milk.

There is in the ſtomachs of all animals an acid or ſour juice: nature has given this to aſſiſt in the digeſtion of their food. Of all theſe acids there is none ſo gentle and ſo certain as that of a ſucking calf. This therefore is what the farmer prefers, and is what he calls his rennet or rennet bag. That he may always have it in perfection, we ſhall tell him what is its proper condition. The rennet bag is the ſtomach bag of a ſucking calf, that never taſted any food but milk, and where the curd lies undigeſted.

In ſpring let the farmer recollect the occaſion he ſhall have for theſe bags, and get himſelf a ſufficient ſtore of them. And he muſt order and prepare them in this manner. Firſt let him open the bag, and pour out the curd and thick ſubſtance into a baſon, leaving the reſt that is not curdled in the bag. Let the curd be carefully examined and picked clean. There may be ſpecks of dirt, hair, or other foulneſſes among it; theſe muſt be all taken out, and the curd is then to be waſhed in cold water ſeveral times. By this means it will become perfectly clean and white. When thus cleaned it muſt be laid on a cloth to drain, and then put into a clean diſh; in this it is to be ſprinkled well over with ſalt, uſing a handful or more to this purpoſe, and with the hand rubbing well in the ſalt to every part of the curd. When the curd is in this condition, let it be covered from duſt, and let the bag be cleaned. This is to be done by waſhing it ſeveral times over in cold water. When it is perfectly clean let it be rubbed well with ſalt, and then put in the curd, which has been ſo well cleaned, with the ſalt among it. Finally, let the outſide of the bag be alſo well rubbed over with ſalt.

When a ſufficient number are thus got ready, let them be all laid together in a pot, and the pot tied down carefully. The whole work is done, except what is to be the effect of time. Theſe bags will keep without any danger of ſpoiling, and they are in their full perfection a year after. Though the rennet is beſt after a year's keeping, it may be uſed freſh. The curd gets its right condition from the very time of its being ſeparated by the rennet; and a fault then is not to be remedied afterwards. When the rennet is freſh, the curd is not made ſo firm and ſtrong; and the cheeſe never gets a good conſiſtence; therefore it is better the farmer purchaſe ſuch as are of a right age, than uſe his own too ſoon. The old way of managing the rennet bag was, after a very ſlight cleaning, to hang it up in a chimney; but that is by no means ſo good a way as the ſalting and potting a number of them together: it is neither ſo cleanly, nor does it keep the rennet in the needful degree of ſtrength.

We have ſhewn the way of preſerving the rennet bag, but there remains an article worthy ſtrict notice and attention; that is the ſeaſoning of it. When the bags have been kept a year, let one of them be taken out of the pot and opened. Let the curd be emptied out into a clean marble mortar, rub and grind it well by itſelf firſt; and then add to it the yolks of three new laid eggs, and half a pint of fine rich and perfectly ſweet cream; rub and grind theſe together, and when they are well mixed, dry before the fire one blade of mace, one clove, and about eight grains of ſaffron: when theſe are ſo dry that they will rub to pieces, powder them in a ſmall mortar, and throw the powder to the other ingredients; then work all well together again, till it is perfectly mixed, then let it be put up in the bag again. Make a very ſtrong brine of ſalt and water, by boiling them together; let this ſtand to ſettle, and ſtrain off the liquor into a clean earthen pan. Take about half a gill of the curd out of the bag, and mix it with this brine. This done cloſe up the bag again, and hang it up with the brine, putting in four or five wallnut leaves.

The rennet being thus prepared, is to be ſet by for a fortnight, and will then be perfectly fit for uſe. We have here ſet down at large the management of one bag; and according to this the farmer muſt dreſs all the reſt. His care muſt be to do them one after another, in ſuch time as he ſhall want them; ſo that he may always have one under another, and may never be obliged to uſe any one that is not duly prepared, and that is not a full fortnight old in the brine. Some uſe leſs care in the preparing their rennet, but it is ſparing trouble in a very wrong article; for not only the rennet is ſharper, and goes farther this way, but the goodneſs of the cheeſe depends upon it. Some uſe more care and caution: thus it is not unuſual to add more articles in the ſeaſoning: and others boil a handful of white ſaxifrage, or ſome other herb, in the brine: there is little harm in theſe things, but they are needleſs. We are for delivering fully every neceſſary article, and we caution the farmer ſtrictly and exactly to obſerve them all; but we would not load him with unneceſſary trouble.

CHAP. XXV.

Of new milk cheeſe.

NEW milk cheeſe, called morning milk cheeſe, is a general production of the dairy, like freſh butter. But it muſt differ according to the variation of paſture: this, though it encreaſes or debaſes its value, makes no alteration in the manner of preparing it. In the morning, toward the time of the people's coming in with their milk, let a clean and large tub be ſet ready; and let the milk brought in the evening before, be very carefully ſkimmed. Let the new milk, warm from the cows, be ſtrained into this tub, and pour through the ſtrainer the cream taken from the laſt evening's milk. Some hot water is then to be poured in, in ſuch a quantity as will ſerve to make the whole tolerably warm, which ſcalds the cream.

When this is done it muſt be moved about with a diſh, till it is no more than luke warm. It will then be in a condition to receive the rennet. The proportion of rennet differs according to the ſtrength, but a ſpoonful when good is a very good proportion for three gallons of milk; ſo that if the quantity be one and twenty gallons, the farmer will know he is to put in ſeven ſpoonfuls of rennet. He muſt draw this ſteadily and evenly out, without ſtirring the bag; and very carefully ſtrain it into the milk: for if the leaſt particle of the curd of the rennet fall into the milk, it will be unſeen among the curd it brings on in the whole, and then mixing up with the reſt in the making of the cheeſe it will taint and corrupt. When the rennet is put in, the veſſel is to be covered, and ſtand quiet half an hour. The cover is then to be taken off, and if the proper ſeparation be not made, it is not to be left longer, but more rennet is to be put in. Beſide the difference of rennet, there is a great variety in milk, ſome requiring more of the ſame ſtrength than other. The veſſel is to be covered up as before; and opened at times to ſee the effect. As ſoon as the ſeparation is well made, the curd muſt be well toſſed and worked about in the whey. The beſt method is firſt with a ſhallow bowl, and afterwards with the hands.

The curd being got to the bottom, the whey is to be ſkimmed off with a ſhallow diſh; and the cheeſe fat is then to be got ready to receive the curd. The curd is to be lifted up with the hands and broke, and preſſed down into the fat. When the fat is well filled, the cheeſe board is to be laid over it, and a ſmall weight put upon it. It is to be left thus till all the remainder of the whey is preſſed from it. When it has done dropping, let the houſewife wet a large cheeſe cloth, and lay it over the board, and then turn the cheeſe upon it. Then ſhe is to lay the cloth into the fat, and put the cheeſe in again. She is now, with a thin ſlice, to preſs down the ſides every where: then turning the cloth over it, it is to be carried to the preſs, and there preſſed with a large weight. It is to lie in its preſent condition half an hour in the preſs; after which it is to be turned into a dry cloth, and then put there again.

This practice is to be repeated every two hours; each time uſing a freſh dry cloth; and it is to continue in the preſs till the evening of the next day: only the laſt time it is turned, it is to be put into the fat without any cloth. When it is after this taken out of the preſs, it muſt be put into a tub, and rubbed on both ſides with ſalt. There it is to remain all night; and next morning it is to be rubbed again with ſalt, firſt on one ſide and then on the other, and left upon the brine which came from the firſt and the ſucceeding ſaltings. When it has lain thus three days it is to be taken out, and laid on a ſhelf to dry; and while it is drying the houſewife muſt continue her care, wiping it once every day perfectly clean with a dry cloth, and then turn it on the dry ſide. At firſt it is fit the cheeſe dry ſomewhat quicker than afterwards, which may eaſily be contrived by changing the place.

CHAP. XXVI.

Of a one meal cheeſe.

WE mean, by a one meal cheeſe, ſuch as is made of the milking of one morning or one evening only; but the morning is the beſt time, becauſe the day is then before him for the buſineſs. The method of making this is the ſame with that before deſcribed, only that it is not ſo difficult in the firſt part, becauſe there is no trouble in mixing the cream, and preparing the whole for the rennet. The houſewife ſhould give her milk people a caution to be quick home with their pails; for the moſt advantageous way is, to mix in the rennet when the milk is warm from the cow: it is to be ſtrained into a tub, and the rennet at once put to it, in the quantity before-mentioned. If the milk be not warm it muſt be ſet over the fire to give it a little airing: but a great deal of caution is to be uſed, for a little heat ſerves to make the rennet take effect, and the curd ſeparates the ſooner for it; but if the milk be made too hot another ſeparation comes on, which is not intended in this caſe, and this is the parting of the cream. The effect of heating milk is always a raiſing of the cream more freely and ſpeedily: this is not intended in milk deſigned for cheeſe, for we ſee a great deal of cream is added to the milk in the former method of making the new milk cheeſe.

When the rennet is in, 'tis to be covered up till the curd is formed; and then the cheeſe is to be made as that before deſcribed.

The two meal cheeſe is a cheeſe made of two milkings mixed together, and the common way is to mix the evening's and the next morning milk for this purpoſe. The cream is ſtirred into the evening's milk, and the whole is mixed with the morning's: all this is warmed a little together, and the rennet is put to it, it is then to be covered up, and the whole to be managed into a cheeſe as before.

There is another ſort of two meal cheeſe, which is made by mixing the evening's milk after it has been ſkimmed, with the morning's entire, and this alſo is eaſily enough made into a cheeſe, by firſt warming the whole over a fire.

Theſe cheeſes differ in goodneſs according to the quantity of cream that is in them, and they are all inferior to the new milk cheeſe deſcribed in the preceding chapter. As that conſiſted of the morning's milk and evening's cream, it is the richeſt cheeſe of this kind. As to the others, the one meal cheeſe and the two meal, are juſt equal in goodneſs, when the evening milk is uſed with its cream; but in this caſe the cheeſe is one degree inferior to the other, as there the cream of the evening went to enrich the milk of the morning, without its own milk. The third and pooreſt kind is that made of the two meals or milkings, one of which has been ſkimmed. This reduces it toward the condition of ſkim'd milk cheeſe; but however it is very ſuperior to what is made of ſkim'd milk only, becauſe as that conſiſts of the curd of milk wholly, that had loſt its cream, this is in part compoſed of curd with the cream in the milk, that of one meal not having been ſkim'd. We ſhall add, for the uſe of the poorer farmer, and ſuch as have occaſion for the moſt ordinary cheeſe of all, the manner of making it from milk that has been ſkim'd entirely.

CHAP. XXVII.

Of ſkim milk cheeſe.

THIS is to be made with ſome care; and the ingredient is ſo poor, that without more caution than is needful when there are better materials, there will be no making it. When the milk of two or more meals has been ſkim'd for butter, it muſt be poured into a tub; and then the firſt thing is to taſte it carefully, to find whether it begin to be ſour, for on this depends the manner of working it; if the houſewife cannot perceive any thing ſour in it, ſhe muſt put a part of it into a pot, and ſet it over the fire, making it ſo hot that it ſhall be able to heat the reſt thoroughly.

In the other caſes a richer milk was uſed, ſo that there was danger of raiſing and ſeparating the cream by too much heat; but here there is ſo little that it is in leſs danger of that accident; and the milk being poorer, is not ſo eaſily turned. It will require ſomewhat more rennet and more heat for that purpoſe. This is the method to be followed, if the milk be ſweet; but if it be ſour, or inclined to ſourneſs, it muſt not be ſet on the fire, leſt it ſhould break: in this caſe a ſmall quantity of water is to be made thoroughly hot, and poured in to bring the whole to a due degree of warmth to receive the rennet. When the rennet is in, the veſſel is to be covered, and after this, the cheeſe is to be made in the ſame manner as the former.

CHAP. XXVIII.

Of Cheſhire cheeſe.

THE paſturage in Cheſhire is favourable for cheeſe; ſome ſoils are more, ſome leſs favourable, but none ſo much, at leaſt none more than this. To this article, which they have from nature, the Cheſhire people add a particular care in the making up of their cheeſes: otherwiſe there is not much particular in the method, except what becomes needful from the great ſize. Cheſhire cheeſe is a new milk cheeſe of a very large ſize. The way in which they make it we ſhall deliver preſently; but firſt, we ſhall give their general management of their cattle.

They make their fine cheeſe from the beginning of May to the end of September. In the middle of April they turn their milch cattle out to graſs: they make cheeſes as ſoon as they begin this feeding, but the firſt are not the fine kinds, nor are brought to market. They are coarſe, poor, and ill-taſted, and are all conſumed upon the ſpot. The paſtures are too rank at this ſhooting ſeaſon, and the cheeſes partake of this rankneſs. Far from being of that regular and firm texture, the cheeſes made afterwards have, theſe loſe their ſhape, ſwell and become full of holes, ſo that they are neither well taſted nor well looking. Nothing can be ſo unlike what we commonly underſtand by the name of a Cheſhire cheeſe, as what is made in Cheſhire at this time of the year. Till the paſture is come down from its own rankneſs, it does not afford milk fit for cheeſe making. They uſe particular cautions at that ſeaſon: they always boil a part of their milk, which they do not at other times of the year; but this does not anſwer their purpoſe. However, as they are uſed to cheeſe making they begin then; and ſo long as it is bad they keep it for their own uſe.

Some have attributed this fault in cheeſe made early in the year in Cheſhire, to particular weeds; the horſemint has been named as the principal; but this is a palpable error. Horſemint grows all the ſummer; ſo that were it the cauſe the effect would remain. The occaſion is the particular condition of the common paſturage: this in the reſt of the year favours the cheeſe, but it is then too rank. We have named the time of the year at which the fine cheeſe is made, which laſts only five months; after this, though the ſame care and pains be uſed, the cheeſe grows bad again: but they continue making it for ſome time, for the uſe of their own people.

The fault of the cheeſe after Michaelmas, is different from that in ſpring. In April it is rank, and in October it is poor. This is the greateſt proof that can be, not only that the excellence of the cheeſe is owing to the nature of the paſtures, but that this article of food to the cattle is the whole matter on which the difference that good dairywomen find in cheeſe depends. There is good cheeſe made in Suffolk, and we ſee there is bad in Cheſhire: but in general it is reaſonable to conclude, that the ſoil of Cheſhire affords a paſturage particularly fit, and that of Suffolk unfit for cheeſe. We ſee the growth of paſturage in Cheſhire, marked by the condition of their cheeſe. During ſummer, when that food is in its regular and perfect richneſs, cheeſes made there, excel thoſe of any other part of England; but in ſpring the herbage is too rank, and they are deſtroyed by their own richneſs; and in autumn it is too weak, and the cheeſes grow poor.

As the people of Cheſhire begin cheeſe making before the paſturage comes to be good, they continue it after it is decayed; and this with very good reaſon, for they could not any way elſe tell exactly when to begin, or juſt when to leave off. By this conduct they do not loſe a day of the cheeſe ſeaſon;

and what they make before and after they uſe at home. After this they go to making of butter, a great deal of which they ſalt, and this they continue till the cows grow dry. After this account of the Cheſhire cheeſe, we ſhall give the directions for attempting it in other places, according to the rules which are followed there; for in all the country they have but one and the ſame practice, and they very ſeldom fail during the favourable time of the year.

CHAP. XXIX.

The way in which Cheſhire cheeſe is made.

THERE are people in Cheſhire who make poorer cheeſes than others. The difference we obſerve in them, though in ſome degree owing to the keeping, is alſo ſometimes owing to the condition in which they come from the maker. The Cheſhire cheeſe is properly a new milk cheeſe. Some make theſe with new milk, enriched by the cream of the laſt milking, and others of new milk, impoveriſhed by an addition of the ſkim'd milk of a preceding meal. In Cheſhire their paſtures are ſo rich, that they never find it needful to enrich their new milk, for it will alone make cheeſe of the richeſt kind that can be; but ſome of the Cheſhire people impoveriſh their new milk, by mixing the ſkimmed milk of a former meal, and this always debaſes the nature and quality of the product.

They are particular as to the condition of the cow: and this is a caution all farmers would do well to take from them: they find by experience, that the milk of a cow which has juſt calved, is not ſo proper as that a few days after; therefore they never take the milk of any cow for cheeſe till ſhe has been milked four or five times. They uſe their whole ſtore of new milk, a very little excepted, in the cheeſe manufacture. When the morning's milking is brought in, they ſtrain it warm into a large tub, and put in their rennet. About four ſpoonfuls is the quantity they allow to as much milk as will afford a cheeſe of a hundred weight; and there are dairies of ſuch conſequence in that county, that they turn out two cheeſes of about this ſize every day, during the five months they are in the right ſeaſon. They cover up the tub, and when it has ſtood half an hour they open it, and find the curd formed. They are very cautious to hit the right quantity of rennet, which no rule can determine, becauſe of the difference in the ſtrength: for too little does not give the curd a due conſiſtence, and too much makes the cheeſe bitter. After half an hour they uncover the tub, and preſs down the curd with a large ſkimming diſh; and when they have pretty well cleared off the whey, they work the curd with their hands, they break it to pieces in the moſt perfect manner, working it a long time.

This done, ſuppoſing it for a hundred weight cheeſe, they add one pound of ſalt: this they mix thoroughly well with the curd. Then they put the curd into a wet ſtrong and large cheeſe-cloth, and when they have got the whey tolerably well drained out, they put it into the fat, or mould, for four hours, with a good preſſure, putting the fat in the cheeſe preſs, and working it down pretty ſtrongly.

At the end of four hours they take it out, ſalt the outſide, put it into a freſh wet cloth, and put it into the fat, and that into the preſs again: here it is to be kept four hours more; and in the mean time a quantity of good ſtrong brine is to be made of ſalt and water; and put into a large tub.

When the cheeſe has been four hours in the preſs they take it out, and put it into the tub of brine, and there let it lie eight days, all the time covered over with brine, and turned once a day. At the end of this time it is to be taken out, and laid to harden and dry. A quantity of ruſhes are to be cut up, and laid green on a large board: on theſe the cheeſe is to be laid when taken out of the brine, and for the firſt day nothing is done to it; the next morning it is to be turned and wiped with a hair cloth all over; and this is to be repeated every day for twenty days.

At the end of this time it muſt be removed from the bed of ruſhes, and laid on the floor; and it is here to be taken up, and turned once in three days, and at every turning is to be rubbed; till it gets firm and hard: as this is the compleating the work, it is to be managed very carefully; for if the due degree of hardneſs be not given at this time, the cheeſe will be liable to accidents in keeping.

When finiſhed and hardned, the laſt thing is the rubbing it over with ſome butter: half a pound of butter is proper for a cheeſe of a hundred weight, and this ſhould be rubbed thoroughly in all over it, nothing more tending to preſerve the rind in good condition, and keep the cheeſe ſound.

This is the method in that famous cheeſe county. They have rooms built on purpoſe for the drying of their large cheeſes, and they raiſe the floors ſeveral feet above the ground, to preſerve them from damp. In many places they uſe ſhelves put round theſe rooms, inſtead of the floor, which I think the better method, for the cheeſes are more out of the reach of damp, and they are more eaſily turned, and more conveniently rubbed and wiped.

CHAP. XXX.

Of making cheeſe like Cheſhire, in other places.

WHAT I have written on the making of Cheſhire cheeſe, is what I collected from thoſe who are much concerned in that product, and from what I have myſelf ſeen on the ſpot: for I once made a journey thither, and took notes of every circumſtance, intending to attempt the making a cheeſe of the ſame ſort at home.

I ſet about it ſoon after, employing careful ſervants, and over-looking every thing myſelf. The firſt trial did not ſucceed; and I made another; after the ſecond I made a third, and being very much bent upon the thing, I repeated the experiment oftener than a wiſe man ſhould have done: for I found in the end I had been trying to make brick without ſtraw, my materials not ſerving me.

I was not at that time ſo ſenſible as I am ſince made by experience, that the Cheſhire manufacture depends, in a manner, entirely upon the Cheſhire paſtures. On the failure of the milk from one paſture I tried that of another, and went the round of all my own, and ſeveral of my neighbours, but nothing would do. Some was too rank, and ſome too poor, but none came up to that excellent richneſs of the Cheſhire kind.

This I have mentioned as a caution to others: but there is no need it ſhould prevent their making trials, only let them learn from this experience, not to venture ſo many. There may be other grounds that will afford a proper milk; but from ſuch as do not, none can ever make this right kind of cheeſe.

Wherever the farmer has upon his hands a rich, ſhort, and ſweet graſs, with numerous blades, a full body, and few rank weeds, it will be worth while to make a trial; not to ſet aſide the whole buſineſs of his dairy for it, but to make one cheeſe. Let him give the experiment fair play, by making it in the firſt or ſecond week in June, which is the time when the very beſt cheeſes are made in Cheſhire; and having made this trial with care, if it do not ſucceed let him give up the expectation: if it do, he has the opportunity of making a fortune. The misfortune of theſe cheeſes made in the Cheſhire manner in other places, is that they will not keep their conſiſtence; and when that is loſt they ſoon decay. The great happineſs of the Cheſhire paſtures is, that they furniſh a milk which has at the ſame time great richneſs and firmneſs in the curd, which are the two articles whereon the firmneſs and fineneſs of cheeſe depend.

CHAP. XXXI.

Of making ſheeps milk cheeſe.

THE reader who is unacquainted with theſe ſubjects, may ſuppoſe a cheeſe made of ſheeps milk muſt be a very poor one: but this is a great error. They prefer in Cheſhire the cheeſe of the neighbouring parts of Wales, to the fineſt of their own, giving thirty per cent. more for it, and this is all made of the milk of ſheep.

Sheeps milk abounds in curd; all milk conſiſts of the three parts, curd, butter, and whey; but the ſheeps milk affords moſt curd in proportion of any kind. It is natural to this curd to be tender; but there are paſtures on which the ſheep yield a milk as proper for cheeſe, as the cows of Cheſhire. Theſe are principally in and about the borders of Wales.

Denbighſhire is the particular county where ſheep milk cheeſe is fine: this is as famous as the Cheſhire of England. The paſtures are hilly, the ſoil rocky, and the graſs low, but very thick, and entirely free from rank weeds.

We have nearly the ſame paſture in ſome parts of Hertfordſhire: the farmer will know it by the ſhortneſs and dark look of the graſs, and by the little blue bell flowers, which are the principal weed that grows among it. In theſe paſtures ſheep yeld a milk, the curd whereof is firm, and therefore there is all the advantage, and little of the inconvenience attending this ſpecies. Cheeſes made of this milk are extreamly rich and mellow. They never have any great degree of hardneſs; but their richneſs is always a recommendation, and another is their ripening very quick; for one of a moderate ſize will be fit to eat in four months.

This may very well tempt the farmer to make a trial, and the price may encourage him farther. 'Tis a cheeſe that in many parts of England brings from five pence to ſeven pence a pound retail; and might be ſet at a much higher rate in London.

Five ewes, upon a good paſture, will give two gallons of milk a day: upon an indifferent one they will give a gallon and half: upon this the farmer may judge how many he will ſet aſide for this purpoſe of milking. He may count five ewes as the ſame with one cow, and he will not be much miſtaken. The ſheep are to be milked morning and evening, and when they are a little uſed to it will ſtand very quietly. The milk of the evening is to be ſtrained into that of the morning, and when the milkers come in the next morning the whole is to be mixed with what they bring in. This is the cuſtom in Wales, where they make theſe cheeſes beſt; ſo that the ſheep milk kind is always what we call a three meal cheeſe.

When the milk is mixed, a little of it muſt be heated, and that poured into the reſt to make the whole of the ſame degree of warmth with that which juſt comes from the cow. Then the rennet is to be ſtrained in, and thoroughly mixed with it. As to the quantity, it is to be about one fifth part more than is uſed for cows milk. The veſſel is to be covered, and ſtand quiet till the curd is formed, and after that the procedure is to be much the ſame with that on other occaſions. The whey muſt be ſkimmed off, the curd muſt be well worked in the hands; and afterwards put into a wet cloth and preſs'd, but this preſſure muſt be continued ſix hours. At the end of that time it muſt be taken out, and the cloth ſhifted; the outſide muſt be then ſalted, and it muſt be preſſed ſix hours more, the other ſide being turned upwards.

While this is doing, a bed of ruſhes muſt be made upon the floor, and the cheeſe, when taken out, muſt be laid upon it: and in this manner it muſt lie a fortnight, taking up and turning it every day; and every time it is taken up, rubbing it ſoftly but thoroughly all over, with a dry and not very coarſe cloth. In this time, drying gently and leiſurely, it will get ſome conſiderable firmneſs, for a cheeſe of ſo mellow a kind. When it is thus far prepared, it is to be taken from the floor and laid upon ſhelves, where it will dry more quickly than at firſt, and be thoroughly finiſhed. There may be a cheeſe made with ſheep and cows milk mixed, which will anſwer the farmer's purpoſe in many places, where his paſture would not ſerve for the making cheeſe from the ſheeps milk alone.

There is a ſeaſon when the ſheeps milk may be had in plenty, and without inconvenience: this is when the graſs lambs are ſold off fat: the ewes will then yield a large quantity of milk, and that regularly for ſome conſiderable time; they ſhould therefore be milked, and the produce mixed with the cow's milk for cheeſe. We have mentioned how ſheeps milk abounds with curd; and how fine that is in its kind: being mixed with cows milk, the curd produced from both has the advantage of each kind, it gets firmneſs from the cow, and a delicate mellowneſs from the ſheep.

This curd is to be made into cheeſe in the way we have deſcribed for the new milk cheeſe, and it will excel any that is made of new milk from the cow alone. I have had cheeſe of this kind made upon my own ground, and when it has come to my table, ſome have taken it for one kind of foreign cheeſe, ſome for another; and every impartial perſon has declared it better than moſt kinds.

CHAP.

CHAP. XXXII.

To make a nettle cheeſe.

A Nettle cheeſe is a very thin new milk cheeſe, with an exceeding fine and ſmooth coat. It differs from the common new milk cheeſes more in the form, and the manner of drying, than in any thing eſſential.

For the drying of Cheſhire cheeſes, which are large and thick, they uſe a bed of ruſhes ſpread evenly upon the floor of the room: in the ſame manner a bed of common nettles is the matter on which theſe cheeſes are dried, and from which they receive their name; the nettles upon this occaſion are to be freſh cut; and the manner of making cheeſe is this: let the milk of the morning's milking be taken as it comes in warm from the cows, without any addition. Let this be ſtrained into a large pan, and let there be immediately added as much rennet as will turn it. 'Tis then to be covered up half an hour; then the curd is to be preſs'd down, and the whey ſkim'd off, and when thus ſeparated the curd is to be wrought in the hands. When it is well worked it is to be put into a cheeſe fat, not more than three quarters of an inch deep, and preſs'd to get out the whey.

The ſame method is to be uſed that was directed for the new milk cheeſe, and by this means there will be a very fine one meal cheeſe, thin and delicate, prepared, and ready for drying. When it has been ſufficiently preſs'd it is to be laid on the floor, which is to be firſt ſpread over with freſh nettles, and another parcel of the ſame is to be ſpread over it. Care muſt be taken in the cutting and laying theſe nettles, for the cheeſe is to have an even coat, and that will depend upon the management in this particular. Only young nettles are to be taken, or the tender tops of ſuch as are more grown; and theſe, when they have been laid evenly upon the floor, muſt be preſs'd down, and flatted into an even and ſmooth ſurface: this is the eſſential article whereon the ſmoothneſs of the coat of the cheeſe depends; and if there be any thicker ſtalks, they will take effect upon the tender ſurface of it, and even a rumpled leaf will have the ſame conſequence. When the bed is made flat and even, the cheeſe is to be laid carefully upon it, and a coat of the ſame kind ſpread over it. Every other day freſh nettles are to be brought, and the cheeſe is to be wiped and laid upon the new parcel, covering it with freſh ones. In this manner it is to be kept till it is ready for the table, and no cheeſe ripens finer.

CHAP. XXXIII.

To make a running cheeſe.

THIS is a richer cheeſe, with the ſame advantages of ripening: it is made thus. Mix equal meaſure of ſtroakings of the cow, and rich cream, put this in a clean pan. Set it in a pot of water, that the water may reach up on the outſide as high as the cream and ſtroakings within; then ſet the pot on the fire, till the whole be as warm as milk from the cow. Take the pan out of the water, and put in as much rennet as will turn it. Stir this, and cover the veſſel.

When it is come, preſs down the curd, and take off the whey: then heat the whey ſcalding hot and throw it upon the curds, and after this take up the curd, which will now be in a body: this muſt be done carefully with both hands. The curd is to be raiſed up as whole as poſſible, and laid into the fat; then place it in the preſs, and put a ſmall weight upon it; afterwards put on a larger, but it is too delicate for that forcible ſqueezing. When the whey is got out let it be taken out, ſalted a little, and laid upon a fine even bed of leaves of nettles ſtripped from their ſtalks. It muſt be ſhifted as the other, and will be ripe in three weeks or leſs.

CHAP. XXXIV.

Somerſetſhire cheeſe.

THIS is a large rich cheeſe, named from the county where it is made. The bigneſs is a material article, for I have ſeen the ſame kind of cheeſe made ſmaller, and it has been not at all particular, or ſcarce ſeemed of the nature of the larger. What is farther ſingular is, that there is butter worked into it, which helps the mellowneſs.

Let the milk of twelve cows be ſet over night for cream; and in the morning let the milk of the ſame cows be brought in warm. Let the cream be taken from the over-night's milk, and mix'd with this, let all be ſtrained together into a large tub, and as much rennet put in as will turn it. Let it be covered up half an hour, then open it, break and preſs down the curd; ſeparate the whey, and when the curd has been well worked in the hands, add three pounds of freſh butter. This muſt be worked into the curd, and a little ſalt ſprinkled over it. It is then to be put into the preſs in a large wet cloth, and turned frequently, every time uſing freſh wet linnen, till toward the laſt, and then there muſt be three or four dry cloths. When it is put in for the laſt time it muſt be firmer preſſed, and it ought to remain in the preſs forty hours. When it is taken out of the preſs it muſt be waſhed over with whey, and laid in cloths till dried. It is finally to be laid on a ſhelf, that it may dry perfectly, and there muſt be turned very frequently, and every time carefully wiped.

CHAP. XXXV.

Of the early uſe of wool in the eaſtern countries.

WOOL has been conſidered at all times as a valuable commodity; and that of our country is preferable to moſt other. We find the uſe of wool known in the earlieſt periods, and flocks of ſheep are mentioned in the firſt ages of mankind. Kings have not been aſhamed to employ themſelves in the care of them; and therefore the country gentleman needs not think their wool an article beneath his regard.

The patriarch Abraham had flocks, and the Iſraelites of that early time employed themſelves in the care of them: their neighbours the Midianites had ſuch numbers, that the Iſraelites took among the ſpoil more than ſix hundred thouſand; and two hundred and fifty thouſand were taken from the Hagarites by the ſons of Reuben.

The Ethiopians had ſheep; for when Aſa conquered a part of their country, he carried them away in abundance: the Arabians at the ſame period had alſo ſheep, for they brought more than ſeven thouſand rams at one time to Jehoſaphat; and the Moabites muſt have bred them in great quantity, for Meſha, king of that country, rendered to the king of Iſrael a hundred thouſand lambs, and a hundred thouſand rams. Theſe are paſſages of hiſtory delivered in the old teſtament, and by theſe we find that at this remote time, the Iſraelites had ſheep in great abundance, and that the Midianites and Hagarites, the Æthiopians and the Arabians, and the Moabites fed them alſo in vaſt number.

Here is an account of ſheep bred in a manner all over the eaſtern quarter of the world; and we have occaſional mention of the ſame creatures making a chief object of the care, and a principal article in the riches of the Amalekites, the Philiſtines, and the people of Damaſcus. We ſee a great part of the quarter of the world, then moſt inhabited, devoted to the care of this uſeful animal. This creature was not bred only for its fleſh: the mention of wool is made in ſome of theſe paſſages; and in others there are alluſions to the implements of weaving, and of the methods of preparing wool for the loom. That the Iſraelites fed ſheep for the wool, may be ſeen by the tythe exacted on it. The firſt of the fleece is declared the due of the prieſt: and that other countries knew its value in the ſame manner, 'tis plain from an inſtance in the preſent of the Moabitiſh king before-named, which is, that the rams were given with their wool. The ſtaff of Goliah's ſpear is ſaid to equal a weaver's beam: the fullers field is mentioned in Iſaiah, and by the prophet Malachi; and Ezekiel, in the twenty-ſeventh chapter, calls the people of Damaſcus merchants in white wool.

Theſe paſſages are the ſummary of what is ſaid concerning flocks of ſheep, their wool and its manufacture, in the ſcriptures; and they ſhew that the ſheering of ſheep, the uſe of wool, the manufacturing it into cloth, and the preparing that cloth by fulling, were articles known in the earlieſt time. It eſtabliſhes the care of this animal, and the uſe of its fleece, upon a very great authority of antient hiſtory: it produces examples that may animate private gentlemen to intereſt themſelves in the care and management of its fleece, and kings and legiſlative powers to eſtabliſh and encourage the manufacture of it. This attention both of private perſons of fortune, and of the publick authority and regard, is greatly wanting at preſent in England, for the advancement of our woollen manufactures.

It has been ſaid that Great Britain and Ireland were the reſources of the reſt of the world for wool; but this is a miſtake. Wool was produced in abundance, and wrought into cloth for common ſervice in the whole eaſtern part of the world, before any thing was known of Britain; and of late time, there are many other countries in Europe which may rival us, if we neglect the care, or our legiſlature the encouragement.

It is miſleading the huſbandman, to make him imagine the natural quality of Britiſh wool is ſo ſuperior to that of other countries, that he may manage as he pleaſes, and it will ſtill have the preference. Other nations have been eminent in this article before Britain was attentive to it. We know not whether this iſland was peopled at the time of the earlieſt of the tranſactions, in which wool is mentioned; and long after, when the enterpriſing genius of the Phœnicians puſhed their navigation and their traffick hither, this commodity was not known amongſt our people. They traded hither for tin, which they purchaſed on the Scilly iſlands in Cornwal, then called the Caſſiterides; and as they came hither on that account, they took of thoſe early Britons alſo all that they had to offer in commerce. The ſeveral articles were named, and wool is not of the number. Strabo has committed to poſterity the different commodities: they were beſide tin, lead, corn, cattle, gold and ſilver, alſo dogs of a particular breed, the old and famous Engliſh bull dogs; and hides. Theſe were the articles furniſhed by the Britons, and they had a market for whatever was the produce or manufacture of their country, but they never brought wool to the traders, though they ſold them hides. Therefore we ſee Britain, far from having at all times ſupplied other nations with wool, was a country that late fell into that concern; and that there were manufactures of woollen in the eaſtern countries, and probably in many others, before the uſe of the fleece appears to have been known here. The inhabitants of a great part of this kingdom went naked, and thoſe who covered themſelves uſed the ſkins of beaſts, in a rough and ſavage manner.

As we have ſhewn from ſacred hiſtory, that this was the caſe, we ſhall ſhew it appears alſo in the ſame light from other authorities; and from thence we ſhall deduce the leſſon of induſtry, care, and application to the affair of wool, from the meaneſt farmer to the ſovereign.

It appears that other nations were acquainted with this valuable commodity before it was known in Britain: they may therefore ſupplant us in all places, as they have in many, in this article. Our huſbandman has it in his power to raiſe his woollen manufactures, to a greater perfection than other nations: this is the advantage, let us not ſuppoſe we have more than we have, but knowing the true ſtate and limits of our pretenſions, let us uſe every method to improve them.

CHAP. XXXVI.

Of the early uſe of wool in other countries, according to general hiſtory.

ALL old hiſtorians mention the care of flocks, and value of their wool; the Greeks uſed it for the purpoſes of cloathing, and they refer to times much earlier than their own, as familiar in the ſame uſe; the Tyrian purple was employed in dying woollen cloth; and the early expedition of the Argonauts to Colchis, for what was called the Golden fleece, was no more than a voyage in ſearch of this commodity. Naturaliſts may ſuppoſe their voyage was in ſearch of gold, and the adepts pretend the ſecret of the philoſopher's ſtone was couched under this myſtery: but plain reaſon, and the moſt authentick accounts of the tranſaction, ſay nothing more than this; that the people of Colchis underſtood the management of ſheep, and the manufacturing of their wool, better than any other nation of that time; and that Jaſon, and his partners in that expedition, after encountering many dangers at ſea, brought back a quantity of the wool, and a number of the natives to manage the ſame article in their country. The city of Corinth became afterwards a general mart for wool: and after Pompey had diſperſed the pirates, the ſame article was a very conſiderable branch of the commerce carried along the coaſts of the Mediterranean.

In all theſe ages, nothing was known of Britain. The knowledge the Phœnicians once had of our country was loſt; and they had never communicated it to any other people. This iſland ſubſiſted as a place ſeparated from the whole world, and unknown to its inhabitants; and the hiſtories, ſuch as they are, that give an account of Brute the Trojan, and his deſcendants, their wars and victories, mention not a word of this important article. Our anceſtors, ſomewhat more civilized in thoſe ages than they had been in the preceding, might, for ought we know, have begun to manufacture wool: that they might do ſo is all that can be alledged, we do not know they did; and of this we are very certain, that if they had the knowledge of it, they ſerved none but themſelves: they had no commerce with the reſt of the world.

We not only know that many other kingdoms at that time were famous for their wool, but we are told of ſeveral by name. The ſame accurate writers who mention the commodities of Britain, and do not name wool among them, mention that article as a commodity in others. Spain is mentioned with great commendation, for the wool it produced in thoſe times, and the manufactures made from it: ſome attribute the invention of weaving woollen cloth to the people of that nation. Wool was received in early times from many parts of the Euxine; and the trade of the Baltick was, in a great meaſure, ſupported by it. The Armenians purchaſed wool and woollen cloths of the Turks, in exchange for horſes: and Rome in ſomewhat later time, received woollen manufactures from Alexandria. This all ſtands eſtabliſhed on the beſt authorities; and is related by all the authors who have had occaſion to mention the commerce of thoſe ages. In all theſe times Britain continued negligent of this matter.

It will be ſeen, in the ſucceeding chapters, how valuable a part of our natural advantage we neglected in this article; and we ſhall, I hope, be cautioned not again to loſe ſo great a benefit; which ſo many others have, at different times, taken from us, and will always be ready to take from us again.

CHAP. XXXVII.

Of the wool of different parts of the world; its condition and qualities.

IN countries far north, the wool is generally coarſe, and of little value. In Iceland it is as harſh as hair, and in ſmall quantity. In Norway in general it is but poor; tho' there is ſome tolerably good; that of their natural ſheep is ſhort and coarſe, and ſuch as they bring over from other places often die in the hard winters. They work it up into manufactures at home, but they are of the pooreſt kinds: their cloth is little better than flannel, and the principal uſe of it beſide is in a coarſe kind of knit ſtockings, which they make for themſelves, and the other northern countries.

In Sweden the wool is alſo coarſe, ſhort, and poor: they have been uſed, till of late, to have their woollen goods from us, but they have now encouraged manufactures ſo far, that they have a coarſe cloth of their own fabrick, and to promote the care of this branch of their trade, a duty is laid on the Engliſh.

In Muſcovy they have abundance of ſheep, but their wool is not fine.

In Poland they have ſome wool, but it is not excellent.

Germany, in many parts, abounds in ſheep, and their wool is fine, and the people underſtand very well how to make the beſt of it.

In the Auſtrian Netherlands there is abundance of fine wool, and many of the woollen manufactures have been either invented or improved to a great height there.

France is not famous for its wool, though ſome in the ſouthern provinces is fine: they import a great deal from England, working up our own produce to ſupply other markets in our ſtead.

Spain produces a good quantity of wool, and it is the fineſt in the world.

Portugal has wool alſo little inferior to the Spaniſh: it is fine and delicate, and fit for the niceſt works.

Italy affords ſo much wool that a great deal is annually exported, and it is very good: the Vicentine and Parma in particular are famous for a fine and valuable kind.

In Hungary and Tranſilvania there is a great deal of wool produced, though not of particular excellence, ſo that it is leſs ſought by ſtrangers, and in general it is worked up at home.

In Turkey they have abundance of ſheep, and they carry on a conſiderable traffick in wool.

In Scotland a great deal of good wool is produced, though not equal to that of England. In Gallway, Twedale, and farther north, they have what is very fine, and they underſtand it very well. They had the art of making broad cloth in great perfection before the union. The Glaſgow plads exceed all other manufactures of that kind; and they have many other very good ones. There is a method in the dying the red part of theſe manufactures, which they keep to themſelves, and which gives them the pre-eminence in that manufacture, though all the arts poſſible have been uſed by our people to diſcover or purchaſe the ſecret. The Scots are more honeſt than our people of the ſame rank; it would not have been eaſy to have kept a ſecret of that importance in England, which was neceſſarily entruſted to ſo many perſons.

In the Eaſt they leſs regard the produce of this commodity now; becauſe their principal manufactures are in ſilks and cottons, but there is a great deal of very fine wool in Aſia, Syria, and Perſia. They have a particular breed of ſheep, whoſe wool is long and greyiſh, and they make certain peculiar manufactures of it, and thoſe much eſteemed.

In China and the Eaſt-Indies the produce of wool is ſo great, that they ſhear their ſheep three times a year: and in America they feed abundance of ſheep, whoſe wool, in ſeveral parts, is little inferior to that of our own country.

CHAP. XXXVIII.

Of the methods of managing wool in different parts of Europe.

THE French, who know where the beſt wool is to be had, get what they can from England, not a little from Spain, and purchaſe it wherever good is to be had in other places. The foreign, as well as their own, they divide into parcels, according to the goodneſs, before they work it up or diſpoſe of it. Moſt other countries have the ſame practice, and from their dividing it into three kinds, this is called the triage of wool. Theſe three kinds are called, the firſt, the ſecond, and the third kind of wools. And when the fleece is ſold entire, there is uſually made a diſtinction, according to its quality, into a firſt or a ſecond kind. The proprietor has his choice to ſell his wool, as it is ſhorn, or to clean and ſeparate it. In general the beſt method is to manage every commodity as well, and work it as far as the knowledge or convenience of the huſbandman will permit; for thoſe who buy things in the rough, always make themſelves large allowances for waſte and labour. In many articles the difference between ſelling the produce in this rough way, and ſelling it wrought, ſo far as the farmer can conveniently do it, is thirty per cent.

The wool of Spain comes principally from Caſtile, Arragon, and Navarre: the firſt is generally the fineſt. It makes an admirable mixture with Engliſh wools. Thoſe of France are inferior to ours; yet by a proper mixture of the Spaniſh, and a good fabrick, they have produced cloths very little inferior to our own, when we have kept our wool entirely from them. In Spain they are very choice of their fine wool: they have five different ways of ſelling it. They ſell it, ſometimes ſingly on the ſheep's back; ſecondly, coarſe as ſhorn; thirdly, waſhed and cleaned; fourthly, waſh'd, cleaned, and triaged; that is, ſeparated into the fineſt, ſecond, and coarſer kind; and fifthly, on the ſheep's back at a general price, to pay for one pile what other piles of the ſame quality ſhall be ſold for. They generally find the fourth way the beſt for the ſeller, and the fifth the beſt for the buyer. The difference in quantity between the wool as it is ſhorn, and when cleaned, is about half. The ſecond cleaning, which prepares them for cloth, reduces them near a fifth; and this is the whole waſte.

This will inform the farmer upon what conditions he may ſet the price of his wool, if he chuſe to part with it rough, but it will always be his intereſt to work it as far as he can himſelf.

Having looked into the produce of the wool of different countries, we ſhall conſider the nature of their paſturage, and other accidents; that the farmer may ſee not only where the beſt wool is produced, but gueſs to what the excellence is owing.

Two things contribute to the fineneſs of wool, the ſweetneſs of the paſture, and the cleanlineſs of keeping.

In Spain, the grounds are in a manner barren, and in many of the northern nations, the meadows are covered with a very rich graſs: but the little graſs of Spain is ſweet, and this abundant quantity of the north is harſh and four. A coarſe graſs makes a coarſe wool; and to this we may attribute the ill ſucceſs of thoſe ſeveral ſchemes which have been practiſed, of carrying the ſheep of wool countries into others: the kind is not of ſo much importance as the nouriſhment; and the ſame ſheep in a ſweet paſture will yield the fineſt wool, that will afford but indifferent on a coarſer graſs.

The practical rule is, that the farmer who has a mind to raiſe the credit and price of his wool, ſhould firſt chuſe a proper breed, and then feed them principally upon his ſweet high paſture grounds.

Cleanlineſs is the next article, and this follows the other in courſe, for the ſheep on downs are always cleaner than thoſe in low grounds. The French cannot be ſo careful in this reſpect, becauſe the fear of wolves render it neceſſary for them to houſe their ſheep in winter; and in this caſe there is no poſſibility of their living ſo clean, as when they run in an open paſture, and touch nothing but the graſs waſhed with the dews of heaven. Our covered fold will be little diſadvantage to the wool, if the earth thrown into it be of a ſandy or dry loamy kind, and none anſwers that purpoſe better.

CHAP. XXXIX.

Of the origin of the woollen trade in England.

WE have ſeen how late the people of Britain fell into the care of wool, and we ſhall find, upon farther enquiry, that the progreſs made in it was at firſt very ſlow. This is the more to be lamented, becauſe we have the fineſt paſtures in the world. The improved ſtate of huſbandry has, from time to time, brought in new advantages to tilled land; but at all times the paſturage muſt have had its character of excellence and ſuperiority, nay probably in the times when agriculture was leaſt improved, that part of our produce was beſt, becauſe then the beſt land lay for it. Graſs is a product of nature, in which ſhe needs no aſſiſtance from the labourer, or huſbandman. There never was any time in which this country wanted the means of feeding ſheep, and conſequently there has been no time when it might not have produced wool in abundance. Let the huſbandman remember how many ages other nations ran away with the profit of this great commodity; and let him recollect later inſtances in which they have, and in which, I am ſorry to ſay, they now do rival us through our neglect: what advantage they had before the Britons entered on the trade they may have again, if it be neglected on one hand, or reſtrained by authority on the other.

If we would know by what ſlow degrees the care of wool, and the profits riſing from it, became known in England, we muſt refer to old records in which it has been named, or in which any thing concerning ſheep is to be found. The generality of our anceſtors, in early time, went naked, and ſkins were the covering of the reſt; in the time of the Romans, commerce became more eſtabliſhed in this iſland; and London was a place of great traffick: but wool was not one of the articles in which either our own people, or the Romans traded.

One of the earlieſt notices we have of ſheep in Britain, with reſpect of their value, is found in Stillingfleet *, who tells us, that between the years ſeven hundred and twelve, and ſeven hundred and twenty-ſeven, were made certain laws of king Ina, and in thoſe a price was ſet upon ſheep. The price of an ewe and her lamb together, till a fortnight after Eaſter, is ſet down at one ſhilling. The value of money was then very different from what it is now, but this, with all the allowances that can be made on that head, is but a very poor price. We may learn by it that in king Ina's time the care of ſheep was grown to ſome concern in the iſland: and there are other paſſages of the ſame period, that ſhew wool was an article compriſed in the purchaſe of theſe creatures; but by all we learn on this head, the art of working it was little known, nor was any of it exported either wrought or raw.

Alfred, a name famous for military atchievements, and alſo for the care of arts and commerce, took no ſmall pains to improve this manufacture; but it did not much ſucceed. In the year 885, he ſet about this great work, but wolves were too numerous in the iſland to let ſheep be kept in ſafety.

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* Chronicon Pretioſum, p. 20.

The conſequences of the encouragement this ſovereign gave to the raiſing of theſe animals, was ſeen in the ſucceeding years; for in 918, Edward, who had married the daughter of a country gentleman, diſtinguiſhed by the regard he had ſhewn to this great concern, and thence called by thoſe who little underſtood what they read in earlier writers, a ſhepherd, had his own daughters inſtructed in the art of carding, ſpinning, and manufacturing wool. This double patronage beſtowed by Edward, the countenance he gave to one who employed himſelf in breeding ſheep, and to the example he ſet in making his daughters work the wool, was of ſo much aſſiſtance to the manufacture, that the paſturage of the ſouthern countries became ſoon occupied in feeding ſheep, and every one, fond of recommending himſelf to the royal favour, became a ſhepherd, or at leaſt employed his attention greatly on that article.

Wolves were for ſome time the principal obſtacle to the progreſs of this undertaking; but after many ſtruggles with this inconvenience, Edgar, about the year 961, ſetting a price upon their heads, and by every other means encouraging their deſtruction, three or four years did the buſineſs: there was not in that time a wolf left in the kingdom. The value of the ſheep roſe in proportion to the number: for with the encreaſe in the quantity of wool, the numbers of manufacturers encreaſed, and the demand for it enlarged. In 720, in the time of Ina, an ewe and her lamb together, were valued only at a ſhilling in the beſt ſeaſon; but in 1000, under the reign of Ethelred, a ſheep alone was worth a ſhilling, without any reſtraint of ſeaſon *. This ſhilling was Saxon money.

This ſhews the value of ſheep roſe, but it alſo ſhews that it was ſlowly. No exportation of wool, or woollen cloth, is yet heard of: people principally wrought up the produce for the ſervice of their families.

A hundred years after we find by an accidental paſſage, that the value of ſheep was rather decreaſed, ſo that we may ſee the working up the wool did not thrive. The black book which contained the taxation of every man, toward the ſupport of the king's houſhold, mention money as an equivalent for cattle, and the ſum on each article is ſtated. Ten years before this, if a ſheep was loſt the damage was eſtimated at five pence, but on this occaſion the price laid upon him who choſe to pay his tax in money, inſtead of cattle, was only four-pence in the place of one ſheep.

Purſuing this ſubject in the old records, we find the ſheep more numerous in all the ſucceeding reigns, and we ſee their value again encreaſing conſtantly with their number. In the time of Henry the firſt, about the year one thouſand one hundred and twenty, forty ſheep were valued at one pound.

In one thouſand one hundred and eighty-five an antient record tells us, that by the cuſtom of Beleſhal, the tenants of Sherborn were, on

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* Chron. Pretioſum, p. 81.

certain occaſions, to make their acknowledgment by delivering a ram, but if they choſe to pay in money, the price was fixed at eightpence.

The reader is not to imagine that this price eſtabliſhed upon ſheep, had regard to their fleſh for food, without reſpect to the wool; all hiſtorians are ſilent upon the progreſs of that commodity and its manufactures, but we have, a few years after, a memorable inſtance of the regard ſhewn to it as a national commodity.

Richard the firſt, in the year one thouſand one hundred ninety-tree, returning from the holy war, was taken priſoner by the duke of Auſtria. A vaſt ranſom was required, and toward raiſing it one year's wool was demanded from two of our abbeys. This is a paſſage recorded by Rapin *, and is ſupported on the beſt authorities; and this ſhews, though we have not had any regular account tranſmitted to us of the progreſs of this article of commerce, that all the time the price of ſheep was encreaſing, the value of wool was alſo riſing, and that this was the principal cauſe of their encreaſe in value: at this period wool was become the firſt commodity of the iſland: the thing next named in purchaſes to money.

Till this time we hear nothing of any uſe of wool, except for home conſumption, but this tranſaction ſeems to have opened the eyes of the neighbouring nations. Having received Engliſh wool in payment they found it excellent, and they began to think of it as a purchaſe. The paſtures of Britain now ſhewed their excellence for the feeding this uſeful animal, and the huſbandmen began to acquire a reputation for its management. Exportation of wool became a common practice, and the article grew ſo important, that it was the great ſource on all emergencies. It was the land tax and the malt bill of thoſe early periods.

The firſt notice of its exportation is in the year one thouſand one hundred and ninety-eight; five years from the time of Richard's ranſom. In this year we find, in Maddox's hiſtory of the exchequer, that Gervaſe de Aldermanbury †, rendering an account of the chamberlainſhip of London, gives in this ſingular and important article: fines from merchants for permiſſion to export wool and leather twenty-three pounds twelve ſhillings. When quantities of wool began to be exported, the manufacturing of it at home encreaſed. The ſame exchequer account gives a liſt of ſeveral ſums by the ſale of wool at home; of twenty pounds from one perſon, and of two hundred and twenty-five marks from the ſeizure of a quantity that was attempted to be exported without paying the fine for leave. The quantity of wool ſeized was forty-five ſacks. Each ſack was valued at five marks, and each ſack contained twenty-ſix ſtone of wool. This ſettles the price of wool in England, in the latter part of the reign of Richard the firſt, at little more than two and ſix-pence a ſtone. This two and ſix-pence was, at that time, one eighth of a pound ſilver, and was

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* Rapin's Hiſt. of Eng. v. I. p. 254.

† Maddock's Hiſt. of the Exchequer, p. 532.

equal to about three times that quantity or weight of ſilver now; that is, to ſeven ſhillings and ſix-pence.

The reader will not blame us for deſcending to particulars in a point of this curioſity and importance. We ſhall endeavour to trace the hiſtory of this commodity from the beſt records of earlier time, and ſhew its advances and decline under the different encouragements or oppreſſions of the manufacture.

About thirty years after we found the way of ſerving our neighbours with our wool; we improved ſo far in our own manufactures of it, as to get into the art of dying. At firſt wool was only wrought up in a coarſe plain way for the cloathing of the farmer and his family: by degrees thoſe who beſt underſtood the working it up, brought what they had to ſpare to market; but all this time the wool was only wrought up as it was furniſhed by the ſheep, and all cloth was of the ſame colour. Thoſe who imported wool and woollen cloth from us, in its natural colour, dy'd it at home; and we ſoon learned the art of doing the ſame here. We read in the ſtatute book, that in the ninth year of Henry the third, dy'd cloth was limited by a certain law, as to its quantity and meaſure. Our wars with France broke in upon the progreſs of the national trade in 1242. The perſons and effects of the Engliſh merchants there, and thoſe of the French merchants in England, were ſeized in conſequence of hoſtilities between the two nations; and in 1275, all commerce was prohibited between England and Flanders, upon a like account; but on this occaſion we find an inſtance of the great height to which the wool trade of England was arrived at that time, for a few Flemiſh merchants were permitted to carry over a quantity of Engliſh wool with them, paying the king for the permiſſion. This quantity was no leſs than a thouſand and ſixty-eight ſacks, and the price for leave of exportation was ten ſhillings a ſack. We ſee by this how ſwift a progreſs the commerce of the kingdom, in this article, made, when the huſbandmen underſtood the value of the commodity; and the legiſlature encouraged its manufacture.

We find by theſe accounts how little hiſtorians and others have conſidered this important article. Thoſe who ſpeak of the manufacture of broad cloths in England, follow one another in placing the time of their being firſt made at the year 1331. We ſee from this circumſtance, countenanced by the ſtatute book, that they were not only made but dy'd ſo early as in the year 1220. one hundred and eleven years before; and probably the origin of the manufacture was much earlier than that. The quantity of wool our country produced ſoon after, is to be gueſſed from the vaſt exportation we have named under thoſe Flemiſh merchants; and this is recorded punctually by Rymer *.

In 1284. foreign merchants were permitted to eſtabliſh themſelves in the kingdom, for the encouragement of the woollen manufactures. They had till that time been obliged to lodge in the houſes of our own people, and could not trade otherwiſe than by making their

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* Rymer, vol. 2, p. 50.

landlords their brokers; but now they were permitted to traffick in their own names; and the privilege granted to them was of the utmoſt benefit to the trade.

In 1291. Sandwich in Kent was made the general market, by an act of Edward the firſt, and ſo vaſtly did the trade encreaſe, and the manufacture flouriſh, that five years after the cuſtom was raiſed from twenty to forty ſhillings a bag; and the traffick was able to ſupport it. This demand was indeed repealed, but not becauſe it would have ruined the trade, but becauſe it was made by the king's ſole power. That was a ſtroke too arbitrary for thoſe days of virtuous liberty: the merchants exclaimed againſt it, and they obtained a releaſe from the abſolute exaction, the additional duty being charged by this act upon them with ſuch limitations, that it was in a manner dependent on their pleaſure; and ſoon afterwards it was left to the determination of parliament.

A few years after, we find the traffick for wool and woollen manufactures very flouriſhing in London; and ſeveral of the ſea port towns. The king's duty upon exported wool was eſtabliſhed according to the weight; and the ſcales for weighing it in all parts were made from thoſe in London, and delivered in a ſolemn manner by the lord mayor into the exchequer, to be ſent to their reſpective places.

In 1297. the wars with France demanding a great ſupply: the woollen trade was ſo flouriſhing that recourſe was had to it. The parliament granted for two or three years forty ſhillings a ſack upon wool. This was the exaction that had occaſioned ſo much diſturbance at firſt; but now it was legally eſtabliſhed and regularly paid. The king promiſed never to demand more than the old duty, without conſent of parliament: and the woollen trade flouriſhed under this large drawback, and the diſadvantage of a war together.

Theſe were times of honeſt government. The king was thankful to his ſubjects for ſo large a ſupply, and he was happy to find the woollen trade could bear it: but he demanded it no longer than it was required by thoſe exigences of the ſtate, on account of which it was raiſed. He called a parliament, and of his own free accord gave up the additional duty, publiſhing a proclamation that no more than the old ſum ſhould any where be demanded. The price of ſheep naturally roſe with the value of their wool, but ſtill the number made ſome alteration. We read in Thorn * of three ſhillings apiece being given for three hundred ſheep; but it was at an inſtallation feaſt, 1309. The current price about that time was much leſs, as we find in the acts of the common council of London, and in Dugdale.

In the year 1315, the price of ſheep is eſtabliſhed in ſuch a manner, as to give us a fair inſight into the value of wool at that period. The ſheep, if delivered ſhorn, was fixed at fourteen pence; if unſhorn at twenty pence †, but we muſt not extend this conſideration farther than to the value of the wool, for it was a time of famine.

From this period the woollen trade became an object more than

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* Decem Scriptores.

† Stillingfleet's Chron. p. 72.

ever of the publick concern. Perſons of all nations who could improve the manufacture of broad cloth, were encouraged to come over: and among numbers brought under great encouragements from Flanders, Brabant, and Zealand, there were ſome ſo worthy of the advantages they received, that they ſoon ſet the trade upon a moſt reſpectable footing abroad, and upon the moſt profitable foundation at home. In conſequence of the greater traffick in this article, the price roſe; and more aſſiſtances were drawn from it for the ſtate: in Edward the third's reign, we read of ſubſidy after ſubſidy on wool: and in Richard the ſecond's more ſubſidies were demanded; the traders complained, and the matter being candidly examined, it appeared that though they were not without reaſon of complaint; the trade could bear more loads, and they might ſtill raiſe fortunes.

In the reign of Henry the fourth the parliament granted the king, for a limitted time, a ſubſidy of fifty ſhillings upon every ſack of wool belonging to the natives, and four pounds on thoſe of ſtrangers exported; and ſuch was the produce at that period, and ſuch the foreign demand, that the quantity exported was not leſs than a hundred and thirty thouſand packs in a year. In Richard the ſecond's time the ſubſidy had amounted to a hundred and ſixty thouſand pounds.

The ſame ſubſidy that had been granted to Henry the fourth, was allowed for four years in Henry the fifth's time.

In the reign of Henry the ſixth we find thirty-three ſhillings and four-pence a ſack allowed to the king on the natives property, and forty-three ſhillings and four-pence on that of ſtrangers. The woollen trade encreaſed under all this demand; and Norwich about this time became eminent in it.

In the former reigns the large ſubſidies on wool had been granted only for two, three, or four years, in time of neceſſity; but in the reign of Edward the fourth, the charge of thirty-three ſhillings and four-pence on the wool of the natives, and of three pound ſix and eight-pence on that of ſtrangers was granted to him for life. This proved no check upon the traffick. Encloſures became frequent; the land was improved, the management of the cattle and their wool was better underſtood; and England carried the praiſe for this article before all nations.

In the reign of Richard the third, though the traffick was encumbered with large ſubſidies, it encreaſed continually. In the reign of Henry the ſeventh, the greateſt regard was ſhewn to trade in every article, and in none more than this: the exportation of wool was limitted, and the manufacture of cloths encreaſed accordingly. In Henry the eighth's reign the produce of wool was greater than at any time before; and its price encreaſed with the quantity: farmers were laid under limitations, as to the number of ſheep they were to keep; but theſe were very extenſive, and we may ſee by the account preſerved of this tranſaction, and of the price of things at that time, to what an advance the care of that animal, and the price of its fleſh and wool, had riſen.

No one was to have more than two thouſand; but this with many exceptions. The ſtatute, by way of reaſon, recites "The advanced "price of all the native commodities in the kingdom. That ſome "perſons had at that time vaſt numbers of ſheep, which for victual "had riſen in price from two ſhillings and four-pence, or at the moſt "three ſhillings, to ſix ſhillings, or five ſhillings, or four ſhillings at "the leaſt; and that a ſtone of cloathing, heretofore in ſome ſhires "accuſtomed to be ſold for eighteen-pence or twenty-pence, had ri"ſen to four ſhillings, or three ſhillings and four-pence at leaſt. In "others, where it had been ſold for two ſhillings and four-pence, "or two ſhillings and eight-pence, or three ſhillings at the moſt, it "was then ſold for five ſhillings or four ſhillings and eight-pence the "leaſt."

If we look back to the prices of wool in the thirteenth and fourteenth of Edward the third, the loweſt, viz. the wools of Cumberland and Weſtmoreland, were ſold for more than two ſhillings per ſtone, excluſive of the duty, which was ſomething more than one ſhilling and ſix-pence; and thoſe of Salop, at more than four ſhillings and ten-pence per ſtone, in like manner. So that in fact, there ſeems to have been at this time, no advance in the price of wool from the period juſt mentioned: but very much the contrary, conſidering that the ſhilling was then two hundred and ſixty-four grains; and at this time, but one hundred and eighteen. Nor was it any advance from the cheap price of which H. Knygton ſpeaks, becauſe the ſhilling was then two hundred and thirteen grains. Much leſs was wool dearer at this time, than in the fourth of Henry VI. The price being then not only nearly equal to the higheſt rate mentioned in this act, but the ſhilling then, at the loweſt, contained twenty-four grains more than at the time of the act. Therefore we are to ſuppoſe the complaint then made concerning the dearneſs of wool, to have had reſpect to ſome intermediate later times, in which the price of wool does not now appear; and which was probably occaſioned by monopolies.

As to the price of food it will not be amiſs to inſert here a little piece of hiſtory from Stow, in the year one thouſand five hundred and thirty-three. It was enacted, "That butchers ſhould ſell their "beef and mutton by weight: beef for a half-penny the pound; "and mutton for three farthings: which being deviſed for the great "commodity of the realm, as it was thought, proved far otherwiſe. "For at that time, i. e. one thouſand five hundred and thirty-three, "fat oxen were ſold for twenty-ſix ſhillings and eight-pence, fat "weathers for three ſhillings and four-pence, fat calves for the like "price; and a fat lamb for twelve-pence. The butchers ſold penny "pieces of beef, for the relief of the poor; every piece two pounds "and a half, ſometimes three pounds. And thirteen, ſometimes "fourteen of theſe pieces for twelve-pence. Mutton eight-pence the "quarter, and a hundred weight of beef for four ſhillings and eight"pence. What price is has grown to ſince needs not be ſet down. "At this time alſo, and not before, were foreign butchers permitted

" to ſell their fleſh in Leaden-Hall market of London." I ſuppoſe by foreign butchers, he means ſuch as had not ſerved their apprenticeſhip in London.

CHAP. XL.

Of the wool trade from the time of Henry the eighth.

HUSBANDRY had been in early times little underſtood in England, but the regard to wool, the demand for which was ſo conſiderable, and the price ſo large, gave a ſpirit to the people, which we wiſh had been continued to the preſent.

In Edward the ſixth's reign we had farmers in England, who underſtood the management of paſture ground ſo well, that it were happy if books had been written on the ſubject, which had perpetuated their improvements. The great benefit of encloſures was underſtood fully, and they encreaſed in this reign. The care of the paſturage grew with the number of encloſures, and the thriving of ſheep, and the price of wool roſe with it. It ſold in this reign dearer than in any of the preceding. Statutes were made from time to time, to encourage the manufacture of cloths, and marts were eſtabliſhed in different places.

In the reign of Philip and Mary, thc ſubſidies granted to Edward the ſixth were continued: many good ſtatutes were enacted in favour of the woollen manufacture in this reign; and it throve greatly under the prudent regulations which were eſtabliſhed, and extended itſelf to many parts of the kingdom.

In queen Elizabeth's time a ſubſidy was granted for life on this article, included in tunage and poundage: many good ſtatutes were made, and numbers of the French and Flemiſh leaving their native country becauſe of perſecution, brought over their ſecrets, and encreaſed our credit. In this reign wool unmanufactured roſe from its former price, which might be called thirteen and four-pence to two and twenty ſhillings a tod.

We may eſtabliſh the period from the end of Edward the ſixth's reign, to the end of queen Elizabeth's, as the moſt flouriſhing of all times for the wool trade of England. It has never riſen much higher ſince, and it has very often been much lower; in general, conſiderably below that ſtandard. Yet even in that time we were far from ſupplying all the world, or even all Europe, with cloth; for there were many other countries very eminent in the ſame manufacture: this therefore is an imaginary notion; and it is altogether erroneous to ſuppoſe we ever did, or ever ſhall have that vaſt trade to ourſelves. It is enough if we can get the ſuperiority in the manufactures, which doubtleſs we may; and we may be proud of our ſucceſs, if we can yearly bring in ſuch ſums as it then raiſed; which were, moderately ſpeaking, near three millions a year.

In the time of James the firſt wool afforded large ſubſidies: new regulations were made, and ſtatutes enacted: monopolies were introduced, but the clamours of the people got the better of them: the deſire of growing rich too faſt became general among the woollen dealers, and hurt the trade: abuſes were committed in the making cloth; and our credit declined in foreign markets. Proclamations were publiſhed to prevent the exportation of wool, and ſearch was made into the nature of the abuſes; but in vain. The manufacture ſunk, and the price of wool fell from thirty-three to eighteen ſhillings a tod.

The beginning of king Charles the firſt's reign, promiſed the revival of the woollen trade; but the diſputes ſucceeding reduced it lower than ever. Proclamations took the place of ſtatutes; and the exportation of wool was forbid by ſeveral of them. In 1640, wool was advanced again to twenty-four ſhillings the tod.

In 1671, many attempts were made to reſtore theſe manufactures to their former excellence. The bad conſequences of ſuffering our wool to be exported unmanufactured were ſhewn; and propoſitions were made for gaining ſeveral hundred thouſand pounds a year, by throwing that trade into a better method: but theſe were times in which men better knew what ſhould be done, than how to do it.

In 1685, the French began to ſupply foreign markets with what they called Engliſh cloths. Theſe had been made of Engliſh wool, and while that was ſuffered to be exported; and ſo many diſadvantages laid on our manufactures at home, it was no wonder they could under-ſell us. The publick attention was waked by this, the exportation of wool was abſolutely prohibited, and great encouragements were given for the produce, and working it here into marketable manufactures. This raiſed again the ſpirit of the people, and the advantage was ſoon ſeen: happy had it been if the meaſures ſo well projected had been as properly continued. When wool, except in manufactures, was prohibited exportation from England, the French, and other neighbouring countries, got it from Ireland: this was ſoon ſeen, and its diſadvantages; and laws were enacted againſt it.

In 1703, the woollen manufacture began to flouriſh again in England: a treaty was ſoon after made with Portugal, very advantageous to them; and there was the appearance of their again making great progreſs. The French droop'd in this article, for ſome time after they were deprived of our wool; but they found the way afterwards to rival us, with what they produced at home, and got from elſewhere; and our manufacturers ſaw there was no way but integrity in their dealings, and a care of the trade that could give them the preference. Integrity was wanting in ſome, and knowledge in others, and for ſeveral ſucceeding years things went worſe and worſe: the neglect of thoſe moſt concerned let France get our wool again in great quantity, and our own manufacturers ſunk in proportion: for this has been found at all times, that although the French can carry on their traffick without us, yet they always ſucceed beſt when they have moſt from us; and we droop in proportion.

On two things depends the flouriſhing ſtate of the Britiſh woollen manufacture: the care of the huſbandman in the proper management of his ſheep and their produce; and the preventing the exportation of wool when we have it in the proper condition.

CHAP.

CHAP. XLI.

Of cleaning, carding, and greaſing of wool.

WE have laid down the rules needful to the huſbandman for the choice, breeding, and feeding of his ſheep, and acquainted him with all that is needful to be done in the ſhearing. We will ſuppoſe therefore he has got his wool from the backs of his flock, and proceed to tell him what he is to do with it. The miſtreſs of the houſe naturally undertakes the office of preparing the wool for her families clothing: the huſbandman is therefore to deliver to her ſuch a quantity as will anſwer this purpoſe, rough from the hands of the ſhearers. The firſt thing to be done with this is to open it with ſhears, and cut away all the foul pieces, knots, and lumps of whatever kind. Theſe muſt be laid by for meaner purpoſes, and the reſt thus cleanſed muſt be broke and divided very carefully between the hands, that there may be none of it left matted together.

When it is thus clean, it is ready for carding: but as ſome will be required white, and ſome coloured, it is to be ſeparated. Such as is for colours muſt be divided into different parcels, according to the intended dyes: the uſual way is to keep each parcel in a bag of netting, with the weight marked upon it. Theſe are then to be ſent to the dyers. The white wool as it is, and the other when dyed, are to be wrought in the ſame manner.

The firſt operation is carding: the intent of this is to mix equally every part; to tear it open perfectly; and to diſcover and ſeparate any knots or lumps, which may have been ſo ſmall that they were not obſerved in the breaking of the wool by hand. This ſhould be carefully performed by means of a pair of ſtock cards well faſtened to a form. The whole quantity is to be over and over combed and carded on theſe, and the leaſt knot that is found is to be ſeparated.

When the wool has gone through this management, it is to be greaſed. This is done with oil; and the common kind uſed is the rape oil made from coleſeed. The wool is to be ſpread evenly upon a large flat bed, and the rape oil is to be ſprinkled on it, till there is enough put on to wet every part. Then the wool is to be moulded and worked about with the hand, that every thread may be moiſtened. There muſt be regard had to the quantity of oil employed: it would be eaſy to wet the wool, by pouring on a great deal of oil at once, but this would ſpoil it: the art conſiſts in having every part wetted, and yet none too much. In this conſiſts the art of greaſing: it is of the greateſt conſequence, to moiſten the wool well with a little oil, for on this depends the perfection of the web. If too much be uſed the thread will not draw, but will fall into ſmall pieces.

There is no better way of finiſhing this right, than the trying it at times as it is doing. When the wool is greaſed it is fit for ſpinning: therefore nothing will be ſo proper as to have a wheel by, and try it from time to time. A little oil ſhould be worked in at firſt, and then the wool tried on the wheel: if it draws dry and breaks, a little more oil is to be uſed; for the uſe of this is to keep it moiſt and ſupple, and to make it hang together: this purpoſe it excellently anſwers when a ſmall quantity is well mixed with the maſs; but when too much is uſed, and it is put to the wool in a careleſs or unartful manner, it takes a contrary effect. In general wool requires ſomewhat leſs than a third part of its own weight of oil: therefore weigh the wool, and to every three pounds allow a pint of rape oil: let about two thirds be uſed at firſt, and then the wool tried on the wheel; if this does not anſwer, let ſome more of the quantity be uſed, but carefully and with great diſcretion. Any fatty ſubſtance will do: and indeed any kind of oil. Hogs lard will anſwer the ſame purpoſe; but the oil mixes more eaſily. When any ſolid fatty ſubſtance is uſed, it muſt be melted, and carefully ſprinkled on.

CHAP. XLII.

Of tumming and ſpinning of wool.

WOOL may, for ſome purpoſes, be ſpun as it comes from greaſing; but the better way is to uſe this only as a preparation for tumming. Tumming is another carding, and brings it to a great degree of fineneſs and ſuppleneſs. The method is this.

When it is thoroughly oil'd, let it be well worked in the hands, and then ſpread out as at firſt. Let a pair of long-tooth'd cards be made ready; and let it be very well carded and combed again, drawing it perfectly fine; and ſeparating every thing that is tangled, or uneven. Theſe pieces are called tummings, and are to be reſerved for other purpoſes. They are not to be mixed with the firſt foul parcel, becauſe they will be a great deal finer.

The tumm'd wool is ready for ſpinning. The wheels muſt be large, and a ſteady and careful hand muſt be employed. There is ſo much difference between the wool of one ſhearing and another, that all will not ſpin to the ſame fineneſs. If any one ſhould force a coarſe wool to run into a fine thread, it would not anſwer in the other parts of the manufacture. When the wool is ſuffered to run from the wheel, as it naturally offers, it will hold good in every ſucceeding proceſs.

A judicious perſon will ſee, from the nature of the wool, what ſervice it will anſwer: but whether it be formed for a larger or a finer thread, the ſame care is to be taken in every article. The difference ariſes from the breeds of ſheep, and from the care taken in their management.

There may be two kinds of thread ſpun from all wool; and indeed it always ſhould be ſo. Two manners of ſpinning ſhould make theſe two kinds, which are called the warp and the woofe. The warp is to be ſpun cloſe, round, and hard twiſted, and it ſhould be ſtrong and well ſmoothed: the woofe may be ſpun more looſe, and but half twiſted. The reaſon will appear when the farmer conſiders their uſe. The thread of the warp is to run through the whole, and to endure the fretting and beating of the beam: the woofe requires no great ſtrength or ſmoothneſs, becauſe it only croſſes the warp without violence or ſtraining. It is not only that the woofe does not require the firmneſs and hardneſs of the warp thread; but its being looſer and ſofter makes it anſwer the purpoſe better: it beds the cloſer and evener in the working.

The intent of the woofe is to cover in and unite all together, and this is to be perfected by beating in the mill. This is an operation needful to the cloth, yet the leſs can be made to anſwer the better. The warp is the thread on which the ſtrength of the fabrick is to depend, and the other being hard, makes the cloth fret and wear, whereas the leaving an open looſe thread for the woofe, gives it a pliable ſoftneſs.

We hear much of late of the French cloths; people praiſe them for their pliantneſs and eaſy wear; and though they are in reality greatly inferior to the Engliſh, many prefer them for this reaſon. The difference is altogether owing to their ſpinning two threads out of every parcel of wool, and keeping one for the warp and the other for the woofe, the latter of which they make ſo looſe that 'tis hard to work it. A very little beating brings the cloth into a body, and when finiſhed it is ſoft and pliant. One would think theſe French cloths, by their look and feeling, could do little ſervice, but the contrary is found upon trial. They never crack, and the looſeneſs of the woofe thread riſing from time to time, keeps them from wearing thread bare. Our hard cloths are liable to grow bare at the ſeams; theſe never do; becauſe they are leſs harſh. They are fitter for gentlemen's ſervice than for labouring people; but it would be eaſy to follow that practice more moderately.

CHAP. XLIII.

Of the winding the thread, and finiſhing the work.

WHEN the wool is ſpun into yarn, it is to be wound. Thoſe who continue the old houſewife's practice of ſpinning it all alike, have nothing to do but to wind it off as it is finiſhed from the broch, into a clew: but the better way is, to ſpin it in two kinds, and wind each off in its ſeparate clew. In this condition it is ready to be made into cloth. The making it up is the buſineſs of the weaver, a trade to be learned by an apprenticeſhip, not by any deſcription that can be given in writing; nor is it our purpoſe, for we limit ourſelves to the buſineſs of the huſbandman, for whoſe ſervice this work is written. However, though we are not to inſtruct the weaver in his profeſſion, it will be proper to inform the farmer ſo far in the nature of it as concerns himſelf; that is, to give him ſo much inſight into the work, that he may know whether he has juſtice done him or not.

Before the yarn is delivered to the weaver, the owner ſhould know how much cloth it may make. The quantity of cloth will be determined by the weight of the yarn. It will be proper to weigh it when in the clews. The general computation is, that it will run yard and pound; provided the wool have been originally good, and the ſpinning carefully performed. If the yarn be coarſe it will make leſs.

The next care is to obſerve how many pounds of yarn are laid in the warp, and ſo many exactly muſt be reſerved for the weft or woofe. He is then to obſerve that the whole be woven cloſe and true; and in every part alike.

From the weaver the cloth is to be carried to the fulling mill, ſome yarn will make the cloth require more milling than other: but let him ſee that it have not more than it requires.

The ſcouring earth is the next article, and none is of more importance. It is a neceſſary ingredient, but it may be a hurtful one. Its uſe is to clean, but it may tear the cloth: its fineneſs is the great care, for if it be coarſe, and the work ill managed, it will beat holes in the cloth.

From the fuller the cloth is to be carried to the ſheerman, this workman is to hurle it, and dreſs it ſufficiently; and ſheer it according to his purpoſe: moderation is the beſt rule. If it be left too rough it will not wear clean, and if too cloſe it will be ſoon thread-bare.

CHAP. XLIV.

Of the dying of wool.

THE huſbandman will conſider we are writing ſolely for his ſervice, and the reader who has candour will not purſue the ſubject farther in this place; or cenſure us for having conſidered it thus far. We do not intend to teach the art of dying any more than to inſtruct our huſbandman in the trade of weaving. We only aim to give him what information may be needful. We have told him how he is to judge of the making up of his cloth; but in this we ſhall proceed a little farther. We ſhall ſhew the countryman how he may tinge his wool for his own uſe at a ſmall expence, and do in a manner all within himſelf.

The colours may be reduced to a ſmall number. Black, red, blue, green, and yellow, may be named as the five principal, and if we add to theſe a pale purpliſh, an aſh colour, and hair colour, from one or other of theſe, and the mixtures compoſed, as we ſhall ſhew from theſe variouſly combined, he will draw all the variety that he deſires.

For blue, grind in a mortar a pound of indigo-blue, and mix it with two gallons of ſtale urine, ſet it on the fire, ſtir it well together, and put in the wool when it is made moderately hot. Let it continue ſome time, and it will have a good ſtrong blue colour. The quantity of the ingredients muſt be proportioned to that of the wool; and the beſt time for dying is before the oiling.

To die black, beat to a groſs powder two pounds of galls, put them into a pot with two gallons of river water, put to them one pound of common green copperas, boil them up well together, and the liquor will be like ink. Put the wool into this and boil it. Then let it cool, take it out, and hang it to dry.

To dye red, ſet on a quantity of river water, in a large earthen veſſel. When the water is ſcalding hot put in a peck of wheat bran: let this boil a few minutes, then pour it into a tub, and put to it twice the quantity of cold water. Set this by for a week. Then weigh the wool you intend to die red, put it into the water and bran; and with it, to every ten pound of the wool, one pound of allum. Let theſe boil together an hour: then take out the wool. Beat to powder a pound of madder root, put it into bran and water, and when it is hot, and the madder is well mixed with it, put in the wool, break and divide it well with the hands; and when the liquor is ſo hot the hands cannot bear it, ſtir it about with a ſtick; when it is well coloured take it out; and hang it up to dry.

To die yellow boil the wool in allum water, made as ſtrong as before directed; then take it out, and hang it to dry. Set on a large pot with river water, and a good quantity of dyer's weed, of which, as alſo of madder, we have ſpoken in their place. Put the wool into this, divide and break it well, that it may receive the colour throughout, and it will thus become of a very good ſtrong yellow.

To die green, the huſbandman's beſt method is firſt to die his wool blue, and when it is dry in this colour let him ſet on a pot of water with dyer's weed, and put in his blue wool. It will receive the die in the ſame manner as the other, and by a natural conſequence the wool become green; becauſe a mixture of blue and yellow makes green.

To die a pale purple the ſame ingredients are to be uſed as for dying black, only in leſs quantity, and in a different management. The black is only a purple carried to that extremity. This is plain from experiments eaſily tried. The ſame ingredients that make this black die make ink, and they will make purple inſtead of black in a ſmaller quantity. If copperas be diſſolved in water, the liquor will be clear. Then let galls be boiled in water, and ſome of that being dropped into the other it will raiſe a purple cloud, and when more is added it will be darker, till it become quite black. In the ſame manner this die, which is for black in the common way, may be made to anſwer for a pale purple. Bruiſe ſome galls to a coarſe powder, ſet them over the fire in a veſſel of river water, and when the whole is hot put in the wool. Let it boil half an hour, then take it out and hang it to dry. The colour of the wool will be ſcarce altered by this. Let the liquor be poured off clean from the galls, and put to it a ſmaller quantity of copperas than is ordered for black. The liquor will inſtantly become black. Draw the wool lightly through it; and it will get a pale purple tinge. If it be not deep enough put it in again. The care muſt be not to make it too deep.

To die hair colour, ſet on a pot with ſtrong allum water: boil the wool in this, and then take it out. Then mix together a good quantity of ſoot and urine, and when they are hot put in the wool. Let it remain a moderate time, then take it out and hang it up to dry. This makes a very good, ſerviceable and laſting colour.

To die aſh colour, make a liquor in the ſame manner as for the pale purple, but inſtead of putting in the wool boiled only in galls, uſe wool died red, as before directed, with madder. This will make a pleaſing aſh colour, with a light glow of the red.

This is the method of dying the uſeful plain colours, in an eaſy and cheap manner; and any one may make a variety of mixtures in cloth from theſe ſimple dyes in the wool. The wool is to be dyed before the ſpinning; and in treating of the mixed colours for cloths, in the next chapter, we ſhall purſue the ſame method, ordering them to be made from the looſe wool thus dyed; nevertheleſs, if any chuſe it, they may in the ſame manner, and with the ſame liquors, dye the yarn or thread after it is ſpun, or even cloth after it is wove. Circumſtances may ſometimes render this management neceſſary, though the other is preferable.

CHAP. XLV.

Of mixing the coloured wools for weaving.

OUT of the plain colours it will be eaſy to make ſeveral mixtures, and thoſe for ſervice are better than the ſimple colours themſelves. The time for doing this is, when the wools are dry, and before they go through any other operation. Nothing prepares them ſo well for ſpinning; for nothing renders them finer than the diviſion in mingling their colours.

If the dyed wool be intended to be wrought up in its plain colour, it is to be treated exactly as the white in all reſpects, oiling, tumming, and the like; but if it be intended for mixture, that is to be made before any thing elſe is done to it.

Mixed colours may be compriſed under two heads, thoſe compoſed only of two, and thoſe compoſed of ſeveral colours.

Of the firſt kind the beſt are thoſe made up of the darkeſt and the brighteſt colours: two light or two dark colours together make no conſiderable variations. The proportions of the ſeveral colours may be varied without end, but there is one proportion which is in general better than any other. This is when a proper light and a proper dark colour are choſen, to weigh two pounds of the dark, and one of the light, and in the ſame manner for any larger quantity, the bright colour being only one third part of the whole. If we ſuppoſe blue and red to be the two plain colours, of which a mixture is to be made, and the whole quantity intended to be uſed to be fifteen pounds; there ſhould be ten of the blue, and five of the red.

The colours thus produced are what are called mixed colours in a diſtinct manner, for when more are uſed they are called medleys: the way is this. Suppoſe three colours are to be mixed, if two be dark and one light, the method is to take an equal quantity of each of the light colours, and twice the weight of both the others, of the dark one; on the other hand, if it be a medley of two dark colours and one light, then an equal quantity of each is to be taken, and they are to be perfectly well mixed together. When the wools of theſe colours are weighed out, a large ſheet is to be ſpread upon the ground, and upon this is to be laid an even and thin layer of the darkeſt colour, or of one of the dark colours, when two are equally dark: upon this is to be ſpread another layer of the lighteſt, and ſo on interchangeably layer over layer, till the whole quantity is ſpread on the ſheet. Then this wool is all to be rolled up into one thick, hard, and ſtiff roll.

The way is to begin at one end, and carefully turn up the edge round itſelf. This makes a beginning, and the reſt all rolls upon it very eaſily; a ſteady hand is to be uſed, and the whole will be thus brought into one long thick maſs. One end of this roll is then to be made faſt in a frame, or a perſon is to kneel upon it, to keep it from moving or untwiſting, and beginning at the other the whole is to be pulled out into ſmall pieces. The ſpreading and rolling of the wool had before partly mixed the ſeveral colours, but this does it entirely.

When this is done the wool is all to be carded and combed together, by a pair of ſtock cards well fixed to a form. This compleats the mixture, it grows into an even and uniform maſs; and if there be any knots or lumps in it they are to be carefully ſeparated.

This combing is to be done in the ſame manner as in the management of white wool; and after this the oiling, tumming, ſpinning, winding, and warping, are to be performed. The cloth thus made has a good look, and wears clean: none is fitter for the ſervice of the family.

The farmer or his wife may thus, without farther information, go through ſo much of the wool-dreſſers and dyers buſineſs as is neceſſary for their own concerns, and in places where thoſe trades are not at hand, it is a great convenience to be able to ſupply them at home.

CHAP. XLVI.

Of hides and leather.

THE wool being diſpoſed of, the care of the hides of ſheep, oxen, and other beaſts remain, and is the farmer's next conſideration. Hides are of various kinds, according to the creatures; and are put to different uſes: and they may be ſold either rough, or with ſome degree of preparation. The entire dreſſing of them is the buſineſs of a diſtinct trade, or taking in the whole courſe of the ſubject, of ſeveral trades; however, it is proper he ſhould know ſo much of the intended operations, as to be able to ſuit his hides to them. The ſkin of the cow and ox kind is ſo much above the others in uſe, that it has, in a manner, appropriated the word hide to itſelf; theſe being called hides, and others ſkins.

The farmer uſually ſells his oxen or cows alive at market, or to the butcher, and has no farther care about them; but he may have occaſion to kill them himſelf. The hide then is ſold ſeparate. If he diſpoſe of it juſt as taken off from the carcaſe, it is called a green hide: but this is the leaſt advantageous method, becauſe the purchaſer knows it will ſpoil upon the farmer's hands, if he does not know what to do with it farther, and therefore thinks he will take what is offered for it.

A hide will keep a great deal longer in winter than in ſummer. Thoſe who deal in them largely are forced often to keep them ſome time; or to ſend them to a conſiderable diſtance before they are wrought. And in this caſe they have a way of preſerving them with ſalt: this is in the farmer's power, as well as theirs: the hide will not be at all damaged by it, and he may preſerve it thus to a better market. A good quantity of common ſalt is to be mixed with a tenth part of allum beat to powder. The hide is to be ſpread upon a floor, and a ſtout fellow is to rub and work this in well with his hands all over it, and particularly where there any crevices, or thicker places than the reſt: when it is thus well ſalted it may be kept ſome time. The beſt method is to double it up, and lay it on a ſhelf in a cellar.

This will anſwer the purpoſe of keeping it ſome days; but if a longer preſervation be required, then two days after this firſt ſalting let it be ſpread out again and rubbed well with ſalt and a little ſalt petre. A hide will thus be preſerved any reaſonable time.

Hides may be preſerved dry in the hair, by carefully hanging them up ſingle in an airy place, wiping them frequently and turning them till they harden.

The buffaloe hides from ſome parts of America are ſent over in this manner, and are dreſſed afterwards.

The hides of the cow and ox kind fall into the hands of the tanner afterwards for leather; but thoſe of other creatures are dreſſed by other trades. Shagreen is a ſkin prepared in a particular manner; and parchment and vellum are alſo manufactures of ſkins.

The ſkin of the ſheep is the proper material for making into parchment, though in ſome places goats ſkins are uſed for that purpoſe.

Vellum is made of the ſkins of ſucking calves: and ſhagreen of the ſkin of the buttocks of an aſs. This laſt is a manufacture of the eaſt. Chamois, or as it is commonly called, ſhammy leather, is made of the ſkin of a particular kind of goat; but is commonly in England no other than a ſheep ſkin dreſs'd in a particular manner.

The ſkins of ſheep and calves preſſed in other ways, make alſo leather of various degrees of value for the covering of books, and other purpoſes, the calf ſkin being more valuable than the ſheeps.

The farmer ſees here what are the uſes of his various hides, and will know by this general account, that he needs not want purchaſers. The principal, which are the hides of the ox kind, go to the tanners; and he is ready to receive them in either of the conditions we have named, that is green, ſalted, or dried. He throws them into pits with lime and oak bark, and by that means takes off the hair, and hardens the ſkin. The tanner, when he has gone through his buſineſs, delivers the hide to the currier, who finiſhes the preparation and delivers it for uſe. We ſhall not attempt to inform our huſbandman in theſe particulars; they are ſeparate trades, and never can fall within the compaſs of his practice. All that he can be required to know is how, to whom, and in what manner to diſpoſe of the ſkins and hides.

End of the TENTH BOOK.

A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK XI.

Of beer and cyder. IN TWO PARTS.

PART I. *Of* MALT LIQUOR.

CHAP.
1. *Of making malt.*
2. *Of the drying of malt.*
3. *Of the ſeveral kinds of fuel uſed in drying of malt.*
4. *Of the right management of malt, and of additions to it.*

CHAP.
5. *Of the ſeveral kinds of malts and waters.*
6. *Of brewing in general.*
7. *Of brewing in private families.*
8. *The advantage of brewing at home.*

PART II. *Of* CYDER.

9. *Of chuſing a ſpot for an orchard.*
10. *Of diſpoſing the orchard.*
11. *Of making the plantation.*
12. *Of the common management in the making of cyder.*
13. *The reverend Mr. George Turner's method of making cyder.*

The INTRODUCTION.

IN this, as in the preceding parts of this work, we ſhall lead the huſbandman in the road of reaſon and experience: conſidering what has been written as it deſerves; and much more what has been practiſed as it has come to our knowledge. We ſhall begin from the foundation, that he may be acquainted with every part, and underſtand every thing that is directed to be done.

BOOK XI. PART I.

Of MALT LIQUOR.

CHAP. I.

Of making malt.

MALT is a preparation of barley, fitting it for impregnating water with its taſte and qualities, in the moſt pleaſant, wholeſome, and advantageous manner.

We ſhall not trace the ſubject farther back than to the thraſhed and cleaned barley, in this place; becauſe we have before brought that grain from the ſeed to the perfect corn, in a due courſe of huſbandry. Only we ſhall add, that as the beſt barley will always make the beſt malt, there is an advantage alſo in its having grown on a proper ſoil, and having been dried by a right management. On theſe two articles depend the quality of the malt.

In general that barley which is tendereſt and moſt mellow, is beſt for the purpoſe; that which is hardeſt is worſt. The manufacturers call this laſt ſteely barley, and avoid it; knowing it will give them moſt trouble, and ſucceed leaſt in the brewing.

It would not be of much conſequence to the generality who brew, to acquaint them with the advantages of taking the grain from a proper ground, and drying it in a proper manner; becauſe they cannot know thoſe things: but we are here writing to the farmer, who is to make his malt from barley of his own growing and drying: he therefore may chuſe ſuch as will anſwer beſt. The beſt barley for malt is that which has been raiſed on a chalky ſoil, and the worſt is that of clay. The difference is greater than any would conceive; the barley that has grown on clay being naturally hard, and the other tender. In general, the tougheſt lands yield the worſt barley for malt; and the lighteſt and melloweſt the beſt. Therefore let him take ſuch as grows on the lighteſt ſoil he has.

Good malt requires the grain full ripe: it is common to mow barley before it is ripe: in this caſe the corn is lean, and will never yield a rich malt. When it has ſtood to a proper ripeneſs; it muſt be carefully dried after cutting: for if it be houſed before it is ſeaſoned, it will contract an ill taſte; beſide that it will give a great deal of trouble in the making, not coming ſo regularly as better grain. The barley thus managed, is to be thraſhed, and then it is ready for malting.

Making of malt is ſoftening the flour of the barley, and then properly drying it. It is mellowed by water, and it requires a different time of ſteeping, according to the nature of the grain. The barley is to be put into a ciſtern, or other veſſel, and water to be poured in till ſix inches deep above the grain. This will allow for the ſwelling, and will do the buſineſs in two or three days: the fineſt barley always takes the water the moſt kindly. To know when it is ſteeped enough, a grain is to be taken out, and held end-wiſe between the thumb and fore finger, preſſing it gently. If it be hard and ſtubborn it is not enough. When it is in right order it will yield a little; there will be a ſoftneſs perceived in the floury part or body of the grain; and the huſk will ſtart or part a little from it.

The hitting this time is the niceſt part of malt making: if it be not ſteeped enough it will not anſwer well in the reſt of the proceſs; and on the other hand, if ſteeped too long it will loſe its flavour. When the barley is in this right condition, the water is to be drained from it, and it is to lie to come on the floor: this it will do in a little more than twelve hours, in favourable weather: but ſometimes it will be twice or three times as long. From the ciſtern it is to be put into a ſquare hutch, and there to lie about thirty hours. Then it is to be worked night and day, in one or two heaps, as the weather is hot or cold, and turned about once in ſix hours, the outer part inwards, and the bottom upwards: always keeping a clear floor, that the corn lying next it may not be chilled.

This care is to be continued till the malt begins to ſpire, or, as the expreſſion is, to come: after this it is to be turned once in three or four hours; and as it comes more the heap muſt be ſpread thinner, to cool it. The beſt method is to lay it out in general in parcels two foot and a half thick, and about ten foot broad, to come and chip gradually. When it is come enough it is to be turned once in two hours or leſs, for four and twenty hours together; and when it is fixed, and the root begins to be dead, the heap muſt be thickened again, and often turned and worked about, that the growing of the root may not return. A diligent man is to be employed, and he ſhould be without ſhoes for fear of damaging the malt. He muſt turn it frequently, and keep a clean floor: otherwiſe the malt will either mould or ſhoot out in leaf. This laſt is the moſt common accident, and it is what the malſters call acroſpiring. In this caſe the fine flour of the malt is exhauſted in this uſeleſs ſhoot, and the reſt is a kind of chaff.

When the danger of both accidents is over, the malt may be put into the kiln; but a better way is to throw it up into a large heap firſt; in which, being in no danger of ſhooting, it may lie twelve hours, this will mellow it in a ſurpriſing manner. After this it ſhould be ſpread and turned once in ſix hours, and this repeated four times. The weather is a great article in malt making, and its changes make ſo much variation, that no fixed rule can be eſtabliſhed. Twelve hours is about the time it uſually requires to mellow in this heap, but ſometimes an hour or two leſs, and ſometimes an hour or two more will be better; this muſt be tried by examining it: if it heat too faſt it will be greaſy. The other times of turning muſt alſo be varied according to the temperature of the air. The farmer ſees what is the deſign of the work, and he is to turn it an hour ſooner, or later, according to the opportunity. If he make his malt himſelf this is a very material part of knowledge, and, if he do not, it is fit he ſhould underſtand the proceſs, that he may know whether thoſe to whom he puts it to be made, do him juſtice.

When the malt is in the condition we have named, it is to be brought to the kiln to be dried.

CHAP. II.

Of the drying of malt.

THERE are various degrees of drying malt, according to its intended uſe; and different contrivances for the doing of it. The paler the malt is to be, the more gentle muſt be the drying: but in this there is a great deal of variation. The paleſt malt will require ten hours or twelve in drying, whereas the browneſt will be very well dried in four, and a middling kind in ſix or ſeven hours.

There is a diſpute among malſters, about the thickneſs the malt ſhould lie upon the hair cloth for drying. Our anceſtors ſpread it very thin, they rarely let it lie at more than three inches deep: our late improvers, as they call themſelves, lay it ſix inches or more; but this is a great error. About four inches is a proper thickneſs: in this manner a ſpace of fifteen foot ſquare will dry two quarters of malt. It is not to lie all the time quiet. It muſt be turned upon the hair cloth as upon the floor, more or leſs, according to the nature of the fire, and the time intended to be allowed. If the fire be gentle, and 'tis a pale malt, that is to have ten or twelve hours on the hair cloth, once in four hours is very well for the turning: if it be a kind that muſt dry quicker, once in two hours will be a proper method: obſerving to keep a clean bottom.

When the malt is ſufficiently dried, it muſt be thrown off from the kiln to the floor, and ſpread thin and wide in an airy place, that it may cool. Then it is finiſhed and fit for uſe.

There is not, in all the common arts of life, any that requires ſo nice a caution as the making of malt. The time muſt be conſidered: three weeks is a moderate allowance, often it will take much longer. As different lengths of time are required for drying malt, there have been invented various ways of doing it. The iron-plate frame, and the tile frame, both full of ſmall holes, are eſteemed by many; others prefer the braſs-wire and others the iron-wire frame; and others the hair cloth: the huſbandman is not to give his voice in favour of any one of theſe in general terms; but to conſider the uſe it is intended to anſwer: the nature of the malt to be dried is a material conſideration, for that kind will do for one that will not for another; and when the moſt expeditious can be uſed, without hurt, there is ſomething in the ſaving of fewel. Thoſe which do with the leaſt fewel are the iron-plate frame and the tile frame: they were invented for this purpoſe, and are a ready and cheap method. They dry the brown malts very well, but they will not anſwer for the pale.

None of the methods heat the malt ſo violently as theſe, the corns often jump like parched peaſe, and crack: but they get a fine brown. It is a cheap way; but let the farmer ſee he is not deceived in it, eſpecially if he buy malt of this brown ſort. The nature of it is to look dry, and it is not the worſe for that; but thoſe who ſell it, frequently ſprinkle water over it, and this makes it ſwell up vaſtly. 'Tis fairer to the eye, but this takes away a great deal of its ſweetneſs.

People find the brown malt dried this way apt to ſpoil in keeping: but they accuſe the machine, when the malſters are in fault: all the damage is owing to the ſprinkling water over it; this ſubjects it to decay in keeping. Brown malt, dried on one of theſe frames, will keep as well as any, if it be ſpread to cool as ſoon as made, and no tricks be played with it. All the damage it is ſubject to is, contracting ſomething of a bitterneſs by burning; but this is owing to the careleſſneſs of the maker, more than the fault of the frame.

The careleſſneſs of ſome, and the tricks of others, have turned theſe methods of the plate and tile frame out of faſhion, but without any real cauſe. They are fit only for brown malts, but in a fair and proper management they dry theſe as well as any other of the methods, and much cheaper.

The wire frame comes next after the plate and tile ones, and now is generally uſed in their ſtead. This dries the malt more gently and leiſurely; but there is ſome difficulty in the turning it, and cleaning the bottom.

Of all the methods the plain and ſimple hair cloth is the beſt for the fineſt malts. A ſlow fire under this dries it very gradually and equally, it is eaſily turned as is required, and when it is done there is no difficulty in getting it out, for 'tis only turning it at once and all is clean.

CHAP. III.

Of the fuel to be uſed in drying malt.

THERE is a great variety in the article of fewel for malt, ſome kinds being cheaper, ſome dearer; and ſome better, others worſe. However this is not ſo abſolute, but that ſome of thoſe which are bad for the drying certain ſorts, may be proper for others.

The principal kinds of fuel are five: 1. Coak; 2. Welch coal; 3. Straw; 4. Wood; and 5. Dry fern or brakes. What is to be done by this fuel is to dry the malt, and nothing more: no flavour is required from it, and therefore the purer the fire is, and the cleaner the malt is dried by it the better. All ſmoak is wrong; and therefore all thoſe fuels that yield a great deal of ſmoak, are to be rejected in the drying the nice malts.

Fern is a very bad fuel for this uſe: and at firſt ſight a perſon might join wood and ſtraw under the ſame denomination, becauſe of the quantity of ſmoak, but there is in this a difference. All ſmoak is an enemy to malt; but there are varieties in the taſte and flavour of the ſmoak of different materials. The ſmoak of fern is not only plentiful, but of a very ill hogoe, which it will communicate to the malt. And the ſmoak of ſtraw, though almoſt as plentiful as that of fern, is ſo ſweet, that it ſcarce does any damage. The ſmoak of wood is of a middle nature.

Dividing our fuel into two general kinds; the coak and welch coal being the beſt, and the ſtraw, wood, and fern the inferior: the ſtraw is the beſt of theſe, the wood the ſecond, and the fern worſt.

There never can be a neceſſity of uſing fern, therefore it ought wholly to be excluded: wood may always be had, and muſt be better than fern; and for ſome of the ordinary malts it is a cheap fuel, and anſwers well. Straw, with good management, may be made to do for any but the very beſt and niceſt kinds. With reſpect to the other two coak is the beſt; but the other is very good.

We adviſe the huſbandman to uſe coak, if it is to be had; but let him ſee that it be good and well made: for otherwiſe the inferior fuels may do better. Fine coak is made of large pit coal charr'd, or burnt to a cinder. It is to be burnt till all the ill ſmell is conſumed, and no ſmoak riſes; and in this condition it makes the ſteadieſt and the ſweeteſt fire of any fuel whatever. It is a common negligence to char this coal imperfectly, but the huſbandman who dries his own malt ſhould examine ſtrictly into it; for one ſmoaky piece will do vaſt damage. He may ſee this by the eye, for there is a particular dry aſpect which coak has when well burnt, that is wanting in ſuch as has any of its groſs parts remaining.

The next to pure coak is welch coal: this is called by many culm. It is a fine ſweet coal dug naturally out of the ground. It comes in thin fleaky pieces, and burns to white aſhes with a little flame, and no ſmoak. This brings it nearer to the nature of coak, but it is not altogether ſo pure: however, it is cheaper in many places, and for all but the fine malts will very well anſwer.

Let the farmer, if he have convenience, dry his own malt, for out of this variety of materials it is poſſible the malſter may chuſe the worſt: in ſome places it will not be worth while, becauſe every thing muſt be built for it, and that the farmer may not think this proper, when he has a ſmall family: but in other places moſt of the conveniences will be ready. In the hop countries the ſame kiln that dries hops will dry malt; and ſo on many other occaſions; and wherever it can be done 'tis much beſt at home. As to a little expence, let him conſider 'tis a thing for which there is a conſtant demand. I ſhall offend the malſters; but I muſt add, that if he knew their practices as well as I do, he would ſee more reaſons than are here ſet down for doing his buſineſs himſelf.

CHAP. IV.

Of the right management of malt, and additions to it.

TO have good malt the barley muſt be in perfect order; and in this reſpect the ſweating in the mow is a great article. Nature intends ſome ſuch practice in the finiſhing of all vegetable juices. Apples carried from the tree to the preſs make a poor raw cyder; and 'tis the ſame with the barley: as the apples muſt lie in a heap, the barley muſt be packed ſome days in the mow. I have known ſome farmers to ſave trouble and time, thraſh'd their barley from the cart which they intended for malt; and I have ſhewn them the effects of their error. The malt has been poor, ſteely, and hard, and no art whatſoever could brew good beer with it.

Pure malt requires no addition for the making of fine beer, but fancy or curioſity have led people to make it various ways, and ſome not amiſs. A ſmall quantity of oats are added by ſome: but 'tis a practice I cannot approve. The firſt invention of this was owing to a ſuſpicion of the malſter. A farmer who had been careful of his malt corn would put in the oats, that it might not be changed: and as a very ſmall quantity anſwered for that purpoſe, there was not much harm. But when thoſe who did not underſtand the reaſon of it came to put in more by way of an improvement of the drink, the error was ſoon ſeen. Oats hurt the malt; ſo the leſs of them the better; but ſo much as will preſerve it to the owner, may be done without any great harm.

Others mix beans or peaſe with their barley for malting. This ſeems a more unnatural addition, but I have known it anſwer very well: ſuch a malt well made, and of good barley, will yield a mellower drink than any other. A peck and half of either is enough for five quarters of barley; and peaſe anſwer beſt. The taſte and qualities are much the ſame, but the peaſe come better, and mix more conveniently.

Though the farmer may make ſome additions to his malt, he muſt be very careful that none are made by accident. We have ſpoken of cleaning the corn, there is no occaſion which requires it to be ſo perfectly pure as this. The ſeeds of weeds will get in among it, and ſome are hurtful. 'Tis ſaid thoſe of cockle give the beer an intoxicating quality, and in ſome places melilot is a common weed in corn. This is a moſt miſchievous addition, for the ſeed is very ill taſted.

Tho' oats mixed with barley hurt the common kinds of drink, they may be malted alone, and will make a pleaſant liquor; what is called oat ale, when genuine, is made of them, and it is a ſoft and mellow drink.

Malt may be made of wheat, and a very ſtrong and fine kind of drink brewed from it. A fine malt ſhould be full of flour, mellow within, thin ſkin'd, and of a pleaſant ſmell. A good method is to try it by water. This depends upon the following principle. Barley ſinks in water; but malting makes it ſo light that it ſwims. To try whether it be well made, let ſome fine grains be picked out and put into a glaſs of water. If the malt be mellow they will ſwim, if but imperfectly made they will ſink like raw barley. The corns muſt be entire for this trial, otherwiſe the water will get into them, and they will then ſink, though ever ſo good. The lightneſs in the hand is a good way of trying: and alſo the drawing a grain carefully acroſs a board; for good malt will mark it white.

CHAP. V.

Of the kinds of malts and waters.

MALTS, ſuppoſing the barley to have been equally good, may be divided into three kinds, the pale, the amber, and the brown. The pale has a great deal of time, and a very gentle fire in drying; the amber has a middle degree of fire, and a moderate time; the brown is the quickeſt dried of all. The pale is the richeſt, and it ſells for the beſt price: it may be brewed with well water, but the others require ſuch as is ſofter. The amber is an excellent malt, and the beſt way of brewing it is with a mixture of hard and ſoft water. The brown is the higheſt dried, and requires river water.

The ſeveral kinds of malt may be dried with any fuel, becauſe it is only moderating the degree of the fire; but it is always beſt to give the ſweeteſt to the fineſt malt. Pale malt ſhould, for this reaſon, always be dried either with coak or culm, and the firſt is beſt. The amber may be ſtraw dried, but 'tis not nearly ſo well. As to wood and fern they are uſed in ſome parts of the kingdom, and cuſtom makes the people reliſh the beer brewed from ſuch malt; but to a ſtranger there is a moſt nauſeous taſte of ſmoak in it. The common practice is to brew ſome one kind of malt alone; but the mixing half brown and half pale, is a way to make a very ſound, pleaſant, and wholeſome drink. Waters may be ranked under four kinds; ſpring, river, rain, and pond. Spring water is very proper for the pale malts; but let it be ſuch as is pure. There is a great deal of ſpring water impregnated with various ſubſtances, as ſalt, allum, iron, and the like. All theſe are improper for the common ſervice of brewing. Some uſe them indeed for medicinal purpoſes, brewing drink with them that it may have their virtues, but this is not what we ſpeak of here. We are informing the farmer how to brew good beer; not how to make medicines. River water is in general the beſt for brewing: but to be in perfection it ſhould be ſuch as is not near the head of the river, becauſe that will be of the nature of ſpring water; nor near great towns where filth is thrown in: and to be nice in having it in the greateſt perfection, it ſhould not be uſed after great rains.

Clear river water is ſoft: it is naturally pure, as riſing from a ſpring, and it has been ſoftened by its motion, and by the effect of the ſun and air. River water in general takes out the virtue of malt better than ſpring water; and the difference is ſo conſiderable, that one ſeventh part more malt is required to make beer of the ſame ſtrength from well water than from the other.

Rain water is the ſofteſt of all; and makes the ſtrongeſt liquor from an equal quantity of malt: but the beer made from it does not keep well. It is therefore fitter for ales that are to be drank ſoon, than for beers made for continuance.

Pond water, when pure, is very good for brewing, but where cattle diſturb it, and where there are fiſh it is never clear. In this caſe it neither makes a pleaſant drink, nor takes out the due ſtrength of the malt. When pond water is in its perfection it is of a middle nature between rain and river water: but in places where it is made foul by the before-mentioned accidents, it is worſe than any.

CHAP. VI.

Of brewing in general.

THE malt is firſt to be ground, and let this be done moderately. It ſhould be only cracked, and ſhattered in the mill. This is ſufficient, for the water will thoroughly take out its virtue; and if it be broke more it will not anſwer ſo well in the brewing. Many deſire their malt to be ground very fine, thinking it by that means anſwers better in giving out its ſtrength; but in this caſe it mixes with the water inſtead of impregnating it with its virtues: the wort runs thick, and the brewing goes on coarſely.

Let the farmer have his malt ground ten days before brewing. This is moſt eſſential to the brown malts, becauſe it takes off the fiery taſte they got in their high drying; but it is of great uſe to all. The ground malt muſt be kept in a dry place, and it always mellows in lying. The paler the malt the leſs time it needs lye after grinding. In the London way of buſineſs it is not eaſy to give malt this advantage, becauſe they brew ſo frequently and in ſuch quantities: therefore the family brewer has an advantage. About eight days ſhould be allowed to the pale malts, and from ten to twelve or fourteen to the brown. The malt thus ground and kept is ready for uſe, and we ſhall lead our farmer into the practice, by giving him a general idea of the method in London, where there are perhaps the moſt underſtanding brewers in the world.

Four kinds of beer are brewed in London, ſtout, common butt-beer, ale, and ſmall beer. Stout is the ſtrongeſt beer, brewed from brown malt; and is ſold for forty ſhillings the barrel, or ſix pound the butt, from the wholeſale cellar. To brew this, the water in the copper for the firſt marſh is made to heat ſoon, by pouring in a couple of buſhels of huſky malt, juſt to ſpread over its top. The degree of heat to be given this is the utmoſt that the hand can endure, but it muſt not boil.

When it is in this condition the fire muſt be damped, and the beſt way is by throwing on a good quantity of freſh coals. Then cold water is to be let in till the whole is juſt blood warm. The malt is then to be worked in with oars, half an hour, and this is called the ſtiff maſh. While this is beating up more water is to be boiling in the copper. This is to be let in: and the whole being maſhed again, and well mixed, ſome baſkets of malt are to be thrown over it, and it ſtands an hour. At the end of this time it is to be let out into the under back; and is then boil'd an hour and half. This, with the due quantity of hops, is the ſtout.

The common brown ale, or as they call it ſtarting beer, is made in the ſame manner as the ſtout; but a larger quantity is brewed from the ſame portion of malt. After the ſtiff and ſecond maſh they cap the whole with freſh malt and boil it an hour; and after this ſmall beer is made of it. The difference between brown beer and brown ale is only that leſs beer is made, and it is boiled longer and has more hops, proportioned to the time it is intended to be kept. The pale beers are brewed in the ſame manner, only pump water is uſed, and it is made hotter at firſt, and lowered to be almoſt cold afterwards.

The ſmall beer in London is made thus. They heat the firſt water with ſome hully malt over it, and when it is of a due heat they let in ſome cold, and run it into a tun milk-warm. The malt is maſhed in this; and then the ſecond quantity of water is let in, which is ſcalding hot. It is to ſtand an hour, and then be run off into the under back. This makes one copper of the firſt wort without putting any freſh malt in. The next liquor is to be blood-warm, then hot, and then laſtly, cool.

This is the great ſecret of the London brewing. Their beer has a great advantage from the quantity that is brewed together; and there is a great deal of art in putting in the firſt water blood-warm, and the reſt hot: for this warm water opens the malt beyond any other practice, and makes it ready to receive, and yield all its ſtrength to the hot.

The allowance for ſtout beer is a quarter of malt to one barrel; and this is ſold from the tap at thirty ſhillings. The proportion for the common brown ale is a quarter of malt to a barrel and half. For entire ſmall beer the allowance is a quarter of malt to ſix barrels: tho' ſome allow a quarter to ſive. The allowance for pale and amber ale is a quarter to a barrel and a firkin.

Thus have we laid before the country farmer the general proportions and method of working in the London brewhouſes for their various kinds of drink; and from this and the particulars of the ſeveral kinds premiſed before, he will be able to comprehend the whole theory, art or myſtery of the buſineſs, and may ſafely and ſucceſsfully enter on the practice.

CHAP. VII.

Of brewing for a private family.

TO ſpeak in a determinate manner, we muſt eſtabliſh ſome regular quantity intended to be brewed; and ſome certain ſize of the veſſels. We will ſuppoſe the farmer has a copper, which, when filled to the top, holds a barrel, that is, ſix and thirty gallons; and we will ſay he is to brew five buſhels of malt. He has this in the houſe, it has been ground a proper time, and there is nothing to be done but to put to it the water proper for its kind. Let the water be ſet on in the copper, and when it is pretty hot pour upon it half a peck of malt. This will keep in it ſpirit, ſoften it, and purify it, and make it heat regularly. When it begins to boil ladle it out into the maſh fat, and there let it ſtand about a quarter of an hour.

It is often the neceſſity of the farmer to uſe but indifferent pond water in brewing. In this caſe let him pour half a peck of bran upon it inſtead of the malt, and when it boils ſkum that off. It will take the worſt foulneſs of the water with it; and is to be given to the hogs. In the other caſe, when the water is tolerably pure, the malt is to be uſed, and is not to be ſcummed off, but to be ladled out with the water.

When it has ſtood about the time mentioned, the ſteam will be but little, and the farmer may look down into it and ſee his face in it. This is the country rule, for he cannot ſee it while the ſteam riſes thick. Separate half a buſhel of the malt, and let the reſt run ſlowly and leiſurely into the liquor when it is of this warmth; let it be well ſtirred about as it runs in, and thoroughly mixed when all is together.

It is a common practice to beat and ſtir up the malt in this firſt maſh into a haſty pudding, but this is wrong: the whole brewing always ſucceeds better when it is only well mixed together without ſuch beating. It receives the hot water the more freely, and gives ſtrength to it in a fine manner. When the malt is thoroughly ſoaked, the hot water is to be ladled on by bowls full, and it is to be ſuffered to run out at the tap in a ſmall ſtream, not thicker than a ſtraw. In this manner,

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the liquor will run off clear, and will yet have the full ſtrength and true flavour of the malt, according to its kind; and will much ſooner be fine than in the common way.

This is the method when the farmer is for brewing good ale, and will make his ſmall beer ſeparately, or leſs regards it: but when he minds the ſmall as much as the ſtrong, the ſecond copper of water muſt be poured on quick, and ſuffered to run off in a large ſtream. This will make a good bodied and well taſted ſtrong beer, and yet there will remain in the malt virtue enough for the ſmall.

When the firſt ſtirring of the malt is done, let the half buſhel that was ſaved out be carefully ſpread over it; and then let ſome ſacks, or other covering, be laid upon the tub to keep in the ſteam. The whole is to ſtand in this way about two hours and a half, and in that time the ſecond copper of water is to be made boiling hot. This is to be poured on either briſkly or ſlowly, according to the deſign of more or leſs ſmall beer; and when it is in, let as much run off from the tap as will very near fill the copper. Put half a pound of fine ſweet hops in a canvas bag, and throwing them into the copper boil them half an hour: then take them out; and ſome freſh ones are then to be put in and to boil half an hour. The quantity of hops muſt be greater for beer, and leſs for ale.

If the beer be intended for keeping, half a pound of freſh hops ſhould be put in every half hour, and the whole boiled briſkly for an hour and an half. While this firſt copper of wort is boiling, ſome ſcalding hot water muſt be poured in upon the malt, bowl by bowl; and thus ſo much is to be got in and ſuffered to run off again, that there may be the quantity of another copper ready for boiling, by that time the firſt quantity is boiled off.

When this is drawn off the ſecond running muſt be put in and boiled an hour, with nearly the ſame quantity of hops as at firſt; and while this is doing, preparation may be making for ſmall beer, by pouring on ſuch a quantity of water as the farmer chuſes cold upon the grains all at once, or at twice. This muſt be boiled in the copper in the ſame manner as the ale wort, and muſt have the hops that were boiled before. Each copper of the ſmall beer ſhould be allowed an hour in boiling. In this manner five buſhels of malt will make the farmer a hogſhead of ale, and the ſame quantity of ſmall beer; or if he chuſes otherwiſe, his ale will be much the ſtronger and better. Each copper of wort muſt be ſtrained off through a ſieve, and cooled in four or five tubs. If he chuſes to make it ſtronger, and for keeping, he muſt boil off only the one firſt copper for ale, and the reſt all for ſmall beer; which in that caſe will be of a very good ſtrength.

He will ſee that in this method, although very different from the London brewer's practice, yet all that is valuable in that art is preſerved. He may imitate their methods, by putting in more malt after the ſecond maſhing; and thus running off, according to his pleaſure, a larger quantity of ſtrong or of ſmall beer: but this is getting into a confuſed and perplexed practice. The other is plain, familiar and eaſy: and we may affirm upon repeated experience, that whoſoever follows it, will brew to his ſatisfaction.

CHAP. VIII.

Of the advantages of brewing at home.

WHAT we have propoſed to the farmer we recommend to every middling family. The difficulty is nothing: the time required is only a few days in a year, and the inconvenience not much: the advantages are very many. The ſaving in money is near half in half; and the houſekeeper is ſure that nothing but wholeſome ingredients have gone into the liquor, which he never can pretend to know if he buys it of a brewer.

Moſt people have been deſirous of brewing at home, but they have been deterred by their thinking there was ſome myſtery and ſecret in doing it well; and that there required a great deal of room, and a great many large veſſels, for the brewing a moderate quantity of drink. We have ſhewn this to be an error in both reſpects. The ſecret is in a manner nothing, a few plain words have deſcribed it; and in the method which we have laid down, a moderate copper, and a few common veſſels anſwer the purpoſe of brewing a couple of hogſheads.

Let cleanlineſs be obſerved in every thing relating to a brewery. Many who brew at home, find their beer contract ill taſtes, and grow bad after a little time; they little ſuppoſe how much this may be owing to the careleſſneſs of keeping the brewing veſſels. In families where the brewing comes ſeldom, the utenſils are laid by careleſsly; and they grow mouldy or muſty. When mouldineſs is ſeen, there is a natural caution for the cleaning it away; but there will be muſtineſs when there is no mark to the eye.

Whoever intends to brew at home, muſt look carefully himſelf into this article. Let a copper of water, or two if needful, be boiled ſeveral days before the brewing: let the ſmaller utenſils be boiled in it; and the larger be well ſcalded with it. Let them all be thoroughly cleaned after the ſcalding, and then ſcalded again: after this let them be expoſed to the ſun and air, ſo as to bleach and perfectly ſweeten, but not ſo as to crack them; and after this let them be ſet by for uſe. If every thing be thus conducted, the malt ſuited to the intended kind of liquor, the water to the malt, and the quantity duly proportioned: if the working be carefully heeded, and the veſſels clean, there can be no doubt of the whole ſucceeding to credit and entire ſatisfaction.

BOOK XI. PART II.

Of CYDER.

INTRODUCTION.

WE have gone through the natural and artificial products of the farmer's ſtock, and might here cloſe that part of the undertaking: but as the huſbandman ſhould never be without an orchard, and we would have him make every part of his ground turn to account, we ſhall adviſe him to make cyder from the produce of his apple trees.

Under this head we have an opportunity of communicating to the publick a method, of raiſing this Britiſh liquor to an excellence which renders it equal in value to many wines. This we receive from a clergyman; a gentleman of knowledge and candour; and we have authority to aſſure the publick, that it contains nothing but the reſult of experience.

We ſhall prefix an account of the uſual way of making this liquor. Thoſe who chuſe to practiſe the old method, will have full directions; and thoſe who ſhall attempt it upon the rules preſcribed by this correſpondent, will, by having gone through the other account firſt, perfectly underſtand every thing mentioned in this.

To trace this ſubject from the beginning, we muſt inſtruct the farmer to plant his orchard rightly.

CHAP. IX.

Of chuſing a ſpot for an orchard.

ALL we direct the huſbandman to practiſe is, with a view of profit; his orchard we do not look upon as an ornamental, but uſeful part of his ground: and far from limiting it to the trifling ſervices of the fruit at his table; we intend it as the ſource of conſiderable advantage in cyder. If the huſbandman finds an orchard upon his farm, tolerably planted, and in a good ſtate of growth, he is to make the moſt of it as we ſhall direct: if there be none, let him plant one; if he be fixed for a continuance: and let the land owner never omit that article.

The firſt conſideration is the choice of a proper piece of ground. It is a plantation that is to continue a great while, and may be of very great value, it is therefore worth while to be careful. 'Tis moſt convenient to be near the houſe, for the advantage of gathering the fruit, and for its ſafety from their being ſtolen. Different grounds ſuit different fruits; and if ſuch a ſoil as is ſuited to the kind intended to be raiſed be not firſt choſen, all the expence and care that ſhall follow will breed only diſappointment.

Trees root deep; and accordingly let the huſbandman extend his regard to the nature of the ground, farther than to the ſurface. Of all ſoils for an orchard intended for cyder apples, there is none comparable to a firm, rich loam. As to what lies under it, let the huſbandman ſee it be not a cold tough clay, nor a perfectly barren gravel. Any other bottom will anſwer. In the caſe of a tough clay bottom, the roots will always be chilled, and the branches covered with the moſs: in caſe of the barren gravel, their barks will crack or peel, and the top branches will wither. The depth of the good ſoil is a material article, for trees ſpread out multitudes of roots ſideways near the ſurface; and the extreme parts of theſe will fill all the good ſoil be its depth what it will: it is therefore of the utmoſt importance that they be well ſupplied with nouriſhment.

The next article to the ſoil is the ſituation. An orchard ſhould neither lie on a flat, nor upon the ſteep edge of a hill: if it lie in a flat the roots will be chilled by too much wet, and it will want ſun and air: and on the other hand, if the deſcent is too great, little wet will lie for the furniſhing the roots, and the beſt part of the ſoil will be waſhed away. The proper piece of ground is one that has a gentle riſing: here the ſun and air have free paſſage among the trees, and enough wet will lie for the benefit of the growth, but not enough to do hurt.

If the farmer can find near his houſe a piece of ground that has a gentle aſcent, where the ſoil is a rich, deep loam, and the bottom neither is a cold clay nor a bare gravel, he is happy in a piece for the plantation. There are advantages of ſhelter, and openings to the milder air, which that piece of ground is always to be valued that has; and as this may always be given by a proper plantation, let him be ſure, that if nature has not given it, his care and induſtry do. The north and north eaſt winds are thoſe which will be moſt miſchievous in the ſpring, and very frequently a north weſt in a more advanced growth does great damage; therefore let him plant in ſuch a manner that the trees be perfectly defended from theſe quarters, the north, the eaſt, and the weſt; let it be open to the ſouth to let in the ſun: and when all that is hurtful is blocked out, and all advantageous admitted, the growth will fully proſper.

The trees planted to defend the orchard will grow up with the others, only let the farmer be careful not to run into one diſadvantage by avoiding another: his orchard is to be defended, but it is not to be blocked up. While the winds are kept off, there muſt be a clear and free paſſage for air: this is to be obtained by planting the trees intended for ſhelter at proper diſtances, and trimming them as they grow; leaving on branches enough to break the hurtful winds, yet not ſo many as to choak the paſſage of the air. The fruit trees themſelves muſt be planted alſo with a careful regard to this advantage.

CHAP. X.

Of diſpoſing the orchard.

WE now enter on a point leſs underſtood and worſe practiſed than any thing in the huſbandman's profeſſion; but we ſhall endeavour to lay down ſuch rules as will lead him into a better tract. A free paſſage of air is of the utmoſt conſequence; it muſt have liberty to go briſkly between tree and tree, and to carry up all damp vapours with it, elſe they will deſtroy the hope of the planter. Let him firſt take care of this in planting for defence. If there be riſing grounds towards the north eaſt and weſt, they will defend the orchards without other help; and when they are wanting, let him plant trees for this purpoſe far enough from the fruit trees, that they be not choaked up by them.

The ſame caution is to be obſerved, that the fruit trees do not choak one another. Moſt orchards are planted too cloſe. The deſire of having a great deal of fruit upon a little ground is the cauſe of this, but the method they take defeats the purpoſe. They do not conſider when a tree is planted to what an extent its branches will ſpread, or how far its roots will run. Let our huſbandman take care of this; let him give compaſs for the roots that the trees do not ſtarve one another, and free air room for the boughs, that there may be clear ſpace enough between thoſe of the ſeveral trees at their utmoſt growth for a paſſage of the ſunſhine and winds.

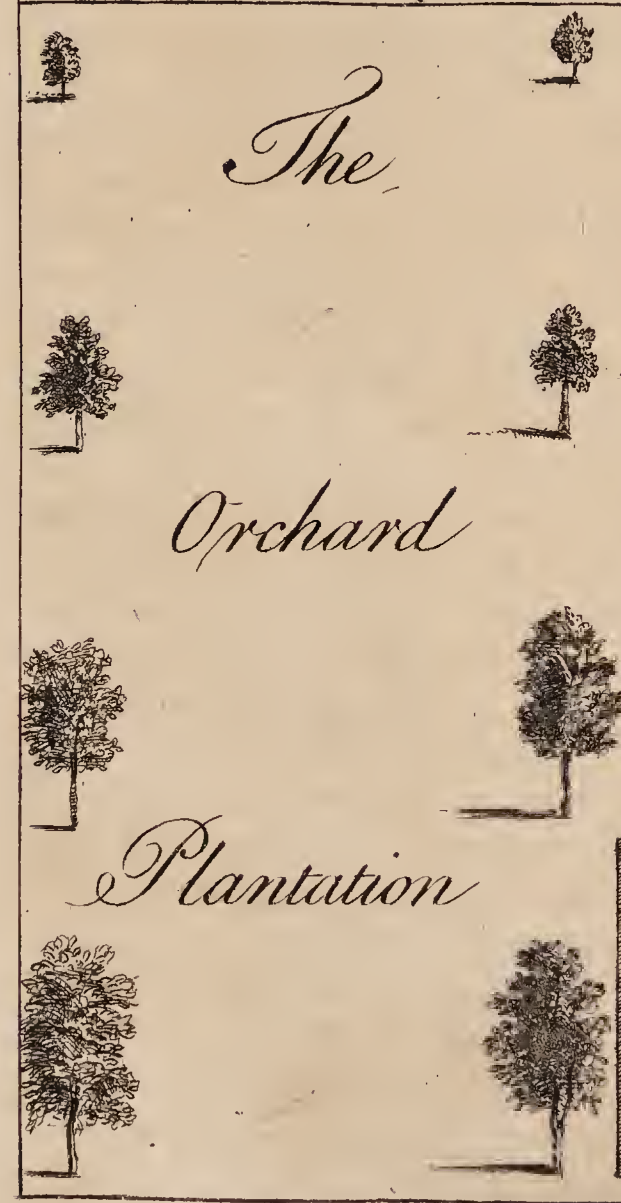
We have, on other occaſions, ſpoken of the great folly of cloſe planting, but in theſe trees it is worſt of all: they ſpread farther, and they are to ſtand longer than others, ſo that 'tis an error not to be remedied. Of the orchards in general in moſt parts of the kingdom, if the trees were but half as many, the fruit would be a great deal more. The natural vapours of the earth being pent up occaſion blights: but that is not all; the perſpiration of the trees is very great, and that joined with the vapours from the earth, will at the ſame time hurt the growth, and give an ill taſte to the fruit: the ſun is a very eſſential thing for the raiſing a cyder apple to its right flavour, and that is not to be had where the whole is kept in ſhelter by the covering of the boughs.

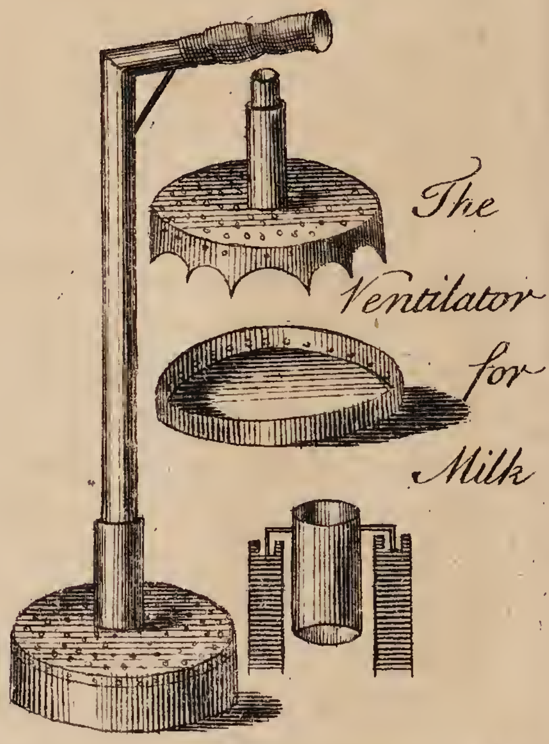
The huſbandman who has an old orchard ſhould thin it by cutting away a great deal of the heads of his trees, but in the planting a new one, another ſort of caution ſhould be uſed, for it is better to prevent than remedy. In the common way of planting all the ground is loſt for other purpoſes; whereas, if the trees be ſet at great diſtances, it may be tilled, and will produce crops; and theſe, far from impoveriſhing the trees, will, by the culture of the ground, cauſe them to grow quicker, to flouriſh more and to laſt longer. We have explained the vaſt advantage of tilling the ground while a crop is upon it. This is a benefit trees will ſhare in common with other growths; and what we are now propoſing is in all reſpects the raiſing them by the horſehoeing huſbandry. The ſlight rooting crops of corn ſown in the ground between them do them very little harm, and the breaking and dividing the land by tillage for theſe crops enriches them prodigiouſly; ſo that the advantage is many times greater than the damage.

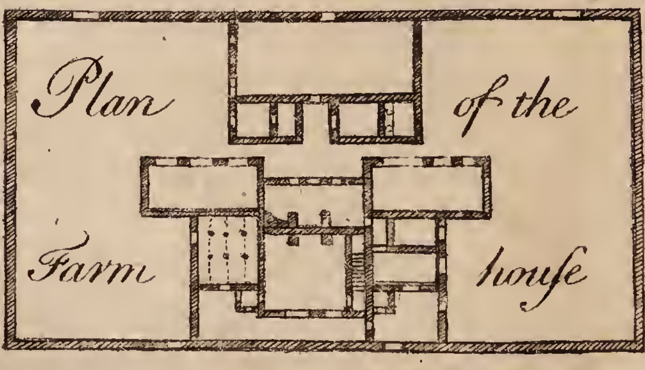
This then is the plan upon which we adviſe the farmer to begin his plantation. He has choſen a piece of ground, it is defended properly, and yet open to the beſt influences of the air. All this ſerves for the advantage of the corn as well as the trees. Let him conſider the piece therefore as a quantity of arable land as well as an orchard. He muſt ſow upon it none but the ſhallow rooting crops, as corn, the pulſes, and the like: for the others would interfere with the main deſign. His ground being choſen, let him make a plan of it upon paper, and mark the places of his trees. Let him diſpoſe them in regular rows; and let theſe rows be thirty yards aſunder; and the trees twenty yards from one another in the rows.

Such a plantation will have all the advantages an orchard can enjoy. It will bear as much fruit as it will be poſſible by any art to obtain from an equal quantity of ground; and the farmer will have the benefit of it as ſo much land like the reſt. In the firſt year every foot of it will bear as well as any other ground; and when the trees are fully grown, he will only loſe the advantage of a ſmall ſpot round each, which it will be prudent

An Elevation of a Farm House, with the Orchard Planted at Distances and the Ground Cultivated between







Compleat Body of Husbandry.

dent in him not to ſow: the ground will all bear, except juſt under the ſhadow of the boughs.

C H A P. XI.

Of making the plantation.

WE will ſuppoſe it ſpring, and the ground he fixes upon to be in paſture: let him not count ſo much upon the profit of the ſummer's graſs, as to defer the work till it is got in or eaten off; this is a ſmall advantage in proportion to what he is about. Early in the ſpring let him plow it up, turning the turf in that it may rot. Three times in the ſummer, let it be plowed over again, to break and divide the ſoil, to tear the turf to pieces, and to prevent the growth of weeds.

The laſt of theſe plowings ſhould be toward the end of September; and this ſhould be very deep, that the ground may be prepared for the reception of the trees.

There are two ſeaſons for planting the trees, and the farmer ſhould be guided by the weather and the nature of the ground. If the ſoil be dry, and the autumn favourable, any time in October the trees may be put into the ground: but if the weather be extremely rainy, and eſpecially if the ſoil be inclined to wet, the beſt time is the ſecond week in March.

As to the choice of the trees, the great article regards their age: for in this many have run into a very miſchievous error, by the planting them too large. An apple tree may be removed when of a conſiderable growth, and it will bear very well after it; but it will neither bear ſo well, nor continue ſo long, as when planted young. The beſt age of a grafted apple tree is at three years from the grafting; and for this uſe they ſhould always be choſen upon a crab ſtock.

Let our farmer by no means take them from a better ſoil than his own: if he can have his choice, let them be ſuch as have ſtood on a ground like his, but not ſo rich. Let a ſtake be ſet up at every place where a tree is to be planted, and a large hole opened; let the earth be well broken, and laid ready to put in when the tree is ſet. A great deal of hurt is done by the holes not being made large enough: when that is large, and the ground is well broken, and ſpread regularly, and ſettled by a gentle watering, the tree roots itſelf at once, and grows without any viſible check from the moving.

It is beſt to buy the trees from a nurſery at a ſmall diſtance, that they may not ſuffer by being kept long out of the ground: the more expedition is uſed in planting them the better; for they get harm by the air coming to their roots. When the trees are brought into the ground, one is to be laid by the ſide of each hole:

hole; and both the roots and the heads are to be pruned before they are put in: the beſt way is to prune the roots as the tree lies, and the head as ſoon as it is planted: the treading about the roots in doing this afterwards, and the gentle ſhaking it gets in the handling, help to faſten and ſettle the roots, and the watering coming on upon that compleats it effectually. In the pruning the roots the firſt care is to look if any be bruiſed; ſuch are to be cut off a little above the bruiſed part: then let the manner of growing of thoſe which are left be examined: if they croſs one another, one of the two muſt be cut off juſt above the place. When the larger roots are thus regulated, the fibres muſt be pruned. Theſe muſt have their ends cut off; and it ſhould be done juſt before the putting them in the ground.

All being ready, let ſome of the fine broken mould be ſcattered in the bottom of the hole, and the tree ſet on it perfectly upright, and not too deep: then let the reſt of the mould be thrown in a little at a time, and the whole laid level and ſmooth at the ſurface.

The head is the next care. In old time gardeners were afraid of taking off the ſmalleſt ſhoot from a new planted tree: at preſent the faſhion is oppoſite; the gardener with his knife is as terrible as the ſurgeon with his inſtruments; and he thinks the more he cuts away the more he ſhews a maſterly hand: both extreams are wrong. Indeed what extream is not! The tree will not be able to ſupport ſo large a head at firſt, as it did while in the native ground; but if ſome be not left on, it cannot thrive. He is to take off a part, and to manage his knife in ſuch a manner, that what is left on may form a well ſhaped head.

When the tree is planted upright, and reduced to a proper ſhape in the head, it is to be ſecured from damage by ſtaking. To this purpoſe a ſtrong ſtake having been driven down near each tree, the ſtem is to be tied to it with a hayband. The huſbandman is to till the ground between the trees. They will grow without his care if the ſeaſons favour them; if not it will be proper for him to water them at times, both the firſt and the ſecond year.

Let there be a good parcel of turf pared pretty thick from a common, and laid down by the foot of every tree. The turf part downwards. This needs not ſet aſide the uſe of watering, for it will make it anſwer much better, becauſe the moiſture will be detained as long as it ought; and this turf may be afterwards dug in as a manure. This kind of plantation we ſhall explain in a folio plate, at the cloſe of our directions concerning cyder.

CHAP. XII.

The general or common method of making cyder.

THE apples intended for cyder muſt be picked clean, heaped, and their juice ſqueezed out. The picking them is an eaſy as well as a needful article; no filth or foulneſs of any kind muſt be mixed with them; and if there be any decayed ones they muſt be thrown away. The picked apples are to be put into the mill, where they are maſhed and ground to pieces: this is the proper method for large quantities; but any bruiſing and ſqueezing them thoroughly will do. The juice ſqueezed out, is to be caught in veſſels, and as ſome foulneſs will have come among it, it muſt be ſtrained. A hair ſieve anſwers for this purpoſe, or a canvas bag, or any other contrivance that will let the juice run through; and keep back the groſs particles.

The juice ſtrained from impurities is to be put into a veſſel, which muſt not be quite full. It is to be covered looſely, and ſet quietly by for three days. Then it is to be covered up as cloſely as may be with clay; and the buſineſs is to watch for its growing fine. This is to be known by trying from time to time. A ſmall quantity is to be drawn out once in a day or two, and examined: when it is ſufficiently clear, it is to be pierced for a more certain examination of the whole.

The farmer is to conſider his cyder according to the nature of the apples under three kinds. 1. The ſummer fruit cyder; 2. The gennet moil cyder; and 3. The redſtreak cyder. Theſe have their three ſeveral times at which they may be naturally expected to arrive at this degree of fineneſs: the time of the ſummer fruit cyder is about a month: the gennet moil cyder ſeldom comes to it till toward the beginning of October; and the redſtreak kind not till January.

Theſe are not certain rules, for there can be none ſuch. The weather, the temperature of the air, and the degree of ripeneſs of the fruit, will make great variations. The winter fruits are to be expected to anſwer in the manner of the redſtreak, and when after a month, or at the utmoſt ſix weeks more than the uſual time, they are not grown fine, they muſt be racked off in the manner of wine.

Many expedients have been uſed to fine down cyder that does not anſwer, but moſt of them are very improper. There is however one eminent ingredient, that is of excellent ſervice to this purpoſe, and may be uſed with ſafety. This is iſinglaſs. It is a harmleſs drug, and when diſſolved is of ſuch a clammy quality that it lays hold of all kinds of foulneſs; and when the fault is not too great, will leave the liquor fine. Iſinglaſs is brought from the northern parts of Europe, where it is made by boiling the ſinewy and ſkinny parts of a fiſh, like a ſturgeon, to a jelly; which is then poured out upon a table to dry. The large lumps are very hard to diſſolve; but when it is beaten out into thin ſhivers, it will melt without difficulty.

Water diſſolves it, but that will impoveriſh the cyder; and any thing that weakens a liquor of this kind, naturally renders it cloudy. The beſt way is to diſſolve the iſinglaſs in a good bodied white wine.

It will be fit for uſe as ſoon as it is thoroughly melted, but not before; this is done ſlowly: ſome haſten it by heat; but that is not ſo well. If the wine and iſinglaſs be ſet over a gentle fire, and kept ſtirring, it will in ſome little time melt; but the wine loſes a great part of its ſpirit, and often the whole gets a burnt taſte. The better way is to take a proper time, and let it diſſolve in the cold. The fine beaten iſinglaſs is to be put into a large bottle, two thirds filled with wine; and ſet by in a cellar. It is to be ſhook gently from time to time, and by degrees it will perfectly diſſolve, and the whole will make a fine jelly.

When the cyder is made fine by an innocent addition, or when it has, in the common courſe of time, become fine of itſelf, it is to be drawn off at pleaſure and bottled, if the farmer chuſes. This is the common rule for making cyder; and, this being premiſed, we ſhall give the reader the new improvements of the gentleman we have before mentioned.

1. In the improvement of cyder the firſt rule to be obſerved is, that all the apples be permitted to drop from the tree; that they may have the full benefit of the ſtock on which they grew, and of the ſun: for by ſtriking down the fruit before it is ripe, the buds are broke off with it, the tree is injured, and the cyder that is made is harſh, for want of time to meliorate the juice.

2. Let the apples (eſpecially in windy weather) be gathered up once or twice a week, and thrown together in ſome ſecure place without doors; for hoarding the fruit in a houſe is apt to give the juice a muſty taſte: it alſo prevents the cyder from quick refining.

3. Let your apple heap be made on ſlanting open ground towards the ſouth, that the falling rains may run from it, and that your fruit may be expoſed to the ſun.

4. To erect a ſlight covering of reed over the apple-heap, ſupported by four tall ſticks, will be very proper; the fore and higher part fronting the ſouth. By the ſhed ſo contrived and ſituated, your fruit may at once have the refreſhment of the air, be defended from rain, and be viſited by the ſun. But let the bottom of the apple-heap be covered, or paved with broad ſtones,

and edged round with the like ſort, to keep the fruit clean and cloſe together.

5. Let your apples lie in the heap a longer or ſhorter time, according to the nature of them. Mediates, being of a hard kind, and their juice auſtere, require a month in the heap, or more: whereas white-ſours, being of a ſofter ſort, a fortnight or leſs for them may be ſufficient. But the time for each muſt be proportioned to the ripeneſs of the fruit, and to the various diſpoſitions of the air and weather. For, according to the quality of the fruit, and the temperament of the air, the apples run ſooner or later to decay.

6. When your apples are pounded, let the muck lie a day before it is ſqueezed. It will improve the colour of your cyder.

7. If you make a tun of cyder at one time, and have a veſſel large enough to contain it all, it is a good way to keep it together: that it may all become fine at the ſame time, and be fit for racking.

8. When your cyder is fine, (which it ſometimes happens to be within a day or two, eſpecially upon a dry, northern, or eaſtern wind) then, by a cock placed within half a foot of the bottom of the veſſel, always allowing room for the dregs to ſettle in; it muſt be racked off into hogſheads. But although cyder be racked never ſo fine at firſt, it will ferment again and become foul, eſpecially in rainy and tempeſtuous wather, and upon ſouthern and weſtern winds; and then your cyder may require ſeveral rackings before you give over your care about it: for all wet ſeaſons are injurious to new cyder, by cauſing a conſtant fermentation for a month or ſix weeks, and longer, if the rough winds and foul weather ſo long continue. You muſt therefore be very obſervant of them, and watchful againſt them, by frequent racking, whether your cyder be fine or not; in order to prevent its over fermentation.

9. Let this be a ſtanding rule for your firſt racking: namely, to ſet about it when the thick, red head, or cruſt, which covered the cyder, begins to ſeparate, and white bubbles appear. For although your cyder be foul at that juncture, it is yet proper to rack it: otherwiſe your cyder may become incurable: for it will then (eſpecially in wet weather) inſtead of a gentle fermentation, be put upon the fret, and in the South-Ham phraſe ſing; the notes whereof may be heard at a conſiderable diſtance, till it becomes pale, thin and languid; and hath ſung itſelf to death.

10. To prevent waſte in racking, and, at the ſame time, to diſpoſe cyder for becoming fine the ſooner, recourſe muſt be had to ſtraining. Get flannel enough for five or ſix bags, each containing ſix quarts. Let thoſe bags be made of a conical figure,

like a ſugar loaf. Let the ſmall ends of theſe bags hang downwards, that the cyder, by its weight, may the ſooner be impreſſed through them. Let the upper and open parts be edged or bound round with inkle; that they may the better ſupport the weight of the liquor.

11. When your bags are prepared, get a ſtrong hoop, and having faſtened two ſticks acroſs in it, tie up your bags to them. The center where the two ſticks meet, having a rope fixed to it, and the bags being made to hang perpendicular over a large veſſel, pour that cyder into them, which remains at the bottom of each hogſhead after racking; and which is too foul to be mixed with the reſt. By this method abundance of cyder, and fit for common uſe, may be preſerved, which muſt otherwiſe have been thrown away with the lees.

12. An empty hogſhead muſt be kept for the reception of the ſtrained cyder, into which it muſt be poured from time to time, as ſoon as it is ſtrained. The caſk muſt be cloſely bunged, as often as the cyder is put into it, leſt the liquor become flat by being too much expoſed in an open veſſel. This cyder muſt alſo be racked, when there is a good quantity of it together, and it is become tolerably fine.

13. To adapt your cyder to all palates, you may, either at your laſt racking, or juſt before you bung and ſtop it up, mix ſeveral ſorts together, and ſo render your cyder rough or mellow, to what degree you think fit.

14. By thus mixing your cyder, you may give all that you intend for your own table, the agreeable taſte of the white ſour. The juice of this pom-royal being of ſuch a predominant quality, as to communicate its flavour, in a very diſtinguiſhing manner, to all the cyder with which it is in any due degree mixed, providence ſeems to have ordained it for this very purpoſe. I know, indeed, that in the parts about Modbury and Kingſbridge, in Devon, where the white ſour-fruit much abounds, the people are more tormented with the gout, than in any other part of the county. This they attribute to the uſe of white-ſour cyder. But ought they not rather to impute their gouty complaints to their grout ale of ſeveral ſorts, with which thoſe parts more abound than any other! are not theſe liquors too foul to have a clear paſſage through them; and what becomes of their contents? muſt they not of courſe rack and torment the bodies that harbour them?

But, if theſe gentlemen are ſo in love with their grouty liquors, as not to perceive the miſchiefs they ſuffer from them; (for, of all fermented drinks, thoſe of the grout kind ſeem to be the worſt) if they are reſolved to acquit the guilty, let them not be ſo unfair, as to condemn the innocent. Before they take up arms to lop off the heads of their white-ſour trees, and to graff them to another kind, it is no bad advice to them to ſuſpend their intended hoſtilities, and to try the difference, by racking their white-ſour cyder more, and drinking leſs of it unmixed. If theſe tender-footed gentlemen do really find their white-ſour cyder ſearching, after they have well ſubdued it by racking; one hogſhead of it will ſerve to improve two of another ſort, and render all three more fit for their tables: for white-ſour cyder freely communicates its virtue to other juices.

15. Various are the practices of ſtopping their cyder; ſome doing it early, and others leaving it open till Chriſtmas, and longer, if the froſt be not ſevere. As I have experienced both ways; I muſt give my judgment in favour of the latter. But due regard ought to be had to the nature of the fruit, and to the time of pounding: the cyder which is firſt made, may, at Chriſtmas, be twice as old as the laſt pounding; coming from a more early fruit, and therefore ſooner diſcharging its windy effluvia, it ought, for that reaſon, to be the ſooner bunged up.

16. While your cyder continueth unſtopped, a ſlight and looſe covering of board, which may reach from hoop to hoop, ought to be put over the bung-hole, to prevent duſt, and other annoyances, from breaking the thin film, which inveſteth the ſurface.

17. Eſpecial care muſt be taken to fill the hogſhead to the very top of the bung-hole, at the laſt racking; that if any light or flying lees remain in the liquor, they may be removed at the bung: for this is frequently the caſe of mellow cyder: and if thoſe lees are permitted to remain in it, the ſurface, by being expoſed to the air, will become ſour. That tartneſs will by degrees render all the cyder of the ſame complexion. Yea, the taint may be perceived to deſcend gradually: for while the cyder is ſour at the top, it is ſound a few inches below it; till it deſcends from top to bottom.

18. This is the grand article in which people are wont to be deceived, and by which they are rendered out of humour with racking of cyder, how much ſoever they are pleaſed with it, when it happens to anſwer their wiſhes. When their cyder turns ſour, they imagine that racking takes away the ſpirit of it, and that it muſt then become ſour of courſe, for want of a body; as they are wont to ſpeak: whereas, in truth, it grows ſour for want of ſkill how to ſecure it after the laſt racking; by removing the light lees which ſwim on the top, before they acquire the leaſt degree of acidity. If the hogſhead is not full, or the bung-hole is not large enough to admit the doing of this by

a ſpoon, the cyder muſt be racked again, though it be as clear as rock water: racking indeed is the ſureſt way; for ſome of the lees may eſcape the ſpoon, and therefore there is no certain dependance upon it.

19. Under the article of racking I muſt obſerve, that the perſon employed in racking your cyder, muſt be particularly careful to waſh and dry his ſtraining bags, racking tubs and buckets. He muſt be as neat in his cellar, as a maid in her dairy. For want of this precaution, as the dairy abounds with ſour-milk; the cellar is ſtocked with a deſpicable ſort of vinegar.

20. The ſeaſon for bottling of cyder for the ſecond year's uſe, (as that of the white-ſour, mediate, redſtreak, fox-whelp, and others of the ſtrongeſt kinds) is at the end of Auguſt, or beginning of September: that the remaining heat of the ſeaſon may give it juſt briſkneſs enough to preſerve it the following winter. Cyder thus ordered will be a prudent reſerve againſt the year of dearth, and ſtand good for ſeveral years: longer, perhaps than the owner's curioſity can prevail over his appetite to keep it.

21. Regard muſt be had to the difference of climates. My warm ſituation (for inſtance) in the ſouthern part of Cornwall, near Falmouth, doth oblige me to defer bottling of cyder till the end of October, or the beginning of November; and even then to let the bottles remain uncorked ſeveral days: otherwiſe (although I do not bottle my cyder till it be two years old) my mellow cyder would burſt moſt of the bottles; and thus I ſhould be undone by the cracking of my brittle ware.

22. My experience this way hath taught me not to fill the bottles higher than the bottom of the neck, even with a rough cyder, and lower ſtill with the mellow ſort. Hereby room is left for the ſubtil and volatile particles to play, and expand themſelves without breaking the bottles. As for the experiment of putting a ſmall piece of round cork into each bottle, for prevention of miſchief, I never tried it. For if the cork happens to be muſty, or the parts of it to be ſeparated in the bottle, it will prove an injury to the liquor.

23. That your ſtock of bottled cyder may be kept from leakage, the corks muſt be tied down with ſtrong packthread. The bottles ought alſo to be laid upon their ſides: but care muſt be taken to decant the liquor with the ſame depending ſide downward on which the bottles lay in the cellar, that ſo the ſediment may be left behind.

24. Thus I have finiſhed the ordering of the fruit; to the making, managing and improving of the cyder to the beſt advantage; and to the rules proper to be obſerved in bottling of it,

and in decanting of it, ſo that it may be preſented to your friends at the table in the moſt elegant manner.

The management of cyder is a ſecret, which the curious are fond of keeping to themſelves. As people have their different and peculiar ways of doing it; and as they are ambitious of excelling one another in this domeſtick liquor; ſo, one would think, there was an envy mixed with their emulation, which hinders them from communicating their ſeveral arts. They converſe freely enough upon the ordering and managing their lands, in ſuch a manner as to reap the moſt advantageous returns from them. But, amidſt their other friendly diſcourſes and communications, they are reſerved and wary upon the ſubject of cyder. Thoſe who have obliged the world with rules for improvement of lands, by the plantation of orchards, and from thence have paſſed on to cyder, have handled this ſubject but ſlightly. Hence it is that that bee of art, Mr. Chambers, hath ſaid little upon this article. Although he ranſacked woods and foreſts, hills and mountains, ſea and land, and the univerſe itſelf, for honey to ſtock his hive: yet (for want of other flowers to make a collection from) he is obliged to take up with a ſingle quotation from Mr. Worlidge; and the reader is ſtill to ſeek for information.

I have for theſe reaſons been the more exact and particular in laying down the rules, and in aſſigning the reaſons of them: inſomuch that I think I have rendered every thing clear, plain, and intelligible. For I have penned it for the ſervice of the farmer, as well as of the gentleman; for the uſe of the poor rack-holder, as well as for his rich and wealthy lord.

The rules I have laid down I have fully experienced, in a courſe of many years reſidence in the South-Hams. When others have found as good ſucceſs in the obſervance of them as I have met with, by rendering their cyder from fifteen ſhillings a hogſhead, worth five guineas; yea, as valuable as an hogſhead of wine (each of which I have actually refuſed for a hogſhead of Corniſh cyder) they will, at leaſt think themſelves ſo much obliged to me, as to ſay that neither their labour, nor my own, hath been ill beſtowed. I have received the thankful acknowledgments of many, who have frankly declared, that their cyder, which before uſed to be thin, poor, and hungry, hath, by their following theſe directions, proved ſo rich, full and good, that their friends (eſpecially thoſe who have been bred in the maritime way) have, during the ſummer ſeaſon, called for it at table, and preferred it to the beſt of Port-wine: and they reckon it a valuable article in houſekeeping.

But I muſt be ſo ſincere with my reader, as to acquaint him, that thoſe who have followed my rules but in part, and who have been diverted by a multiplicity of buſineſs, company, recreation, or pleaſure, from giving a due attendance to their cyder, they have found themſelves much deceived in their expectations, when it was too late to amend their fault.

End of the ELEVENTH BOOK.

A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK XII.

Of the accidents to which the cattle and their crops are liable.

CHAP.

1. *Of heat conſidered in itſelf, and its effects on the ſtock and crop.*
2. *Of drought, its nature and effects.*
3. *Of the care of fields in the management of ſhelter.*
4. *Of ſuiting the crop to the ſoil to prevent the effects of drought.*
5. *Of the effect of the drought on trees, and the way to defend them from it.*
6. *Of preſerving water for cattle in ſeaſons of drought.*
7. *Of obtaining ſupplies of water when the common ponds are dry.*
8. *Of the ſigns and notices of drought to be obſerved by the farmer.*
9. *Of rains.*
10. *Of the ſigns and notices of rain to be obſerved by the farmer.*
11. *Of the ſeveral ſigns of fair weather.*
12. *Of hail.*
13. *Of ſnow.*
14. *Of winds.*
15. *Of the ſigns by which winds may be foreknown.*
16. *Of the damage done by winds to huſbandmen in their crops.*
17. *Of the nature of blights.*
18. *Of the antient and modern opinions concerning blights.*
19. *Of the real cauſe and origin of blights.*
20. *Of damages by eaſterly winds.*

21. *Of damages by late froſts.*
22. *Of damages from weakneſs and ſtarving.*
23. *Of the nature of mildew.*
24. *Of the real cauſe of mildew.*
25. *Of the prevention of mildew.*
26. *Of the remedies of mildew.*
27. *Of ſmuttineſs of corn.*
28. *Of the real cauſe of ſmut.*
29. *Of the prevention of ſmuttineſs by a due care of the land.*
30. *Of the prevention of ſmut by a prudent method in ſowing.*
31. *Of preparing the ſeed againſt a ſmutty crop.*
32. *Of the cleaning of ſmutty corn.*

The INTRODUCTION.

AS it has been our cuſtom in this work, not only to inform the huſbandman of things neceſſary for him to know: but to explain them as minutely and exactly as we are able, that by being familiar to his underſtanding, they might be imprinted in the more laſting manner on his memory: we ſhall endeavour to proſecute the ſame method here, though in this caſe more difficult than any other. There is the more reaſon for attempting it, becauſe ſuch a knowledge is in no article ſo neceſſary. The accidents we are about to treat of are of the moſt important kind; and if the cauſes of them be not properly underſtood, they never can be prevented. For this reaſon, we ſhall in the firſt chapters of this book examine into, and explain to the huſbandman the nature of ſuch incidents in the air and elements which are the occaſions of many of the accidents; that by underſtanding in what manner the hurt is done, he may know what are the means in his power, to prevent or guard againſt it.

Under this diviſion we ſhall alſo conſider rain, hail, ſnow, and the reſt; and inſtruct our huſbandman how far he may foreſee them, and conſequently guard his flock and his crops againſt the danger. After we have enquired into the cauſes, we ſhall trace the effects, and thus endeavour to lay down in a few plain words a ſyſtem of rural philoſophy; which if not enough to ſatisfy the utmoſt curioſity of idle enquirers, ſhall yet offer every aſſiſtance that has been diſcovered to ſerve the practical farmer.

CHAP. I.

Of heat conſidered in itſelf, and its effects on the ſtock and crop.

THOUGH heat be the principle of life in the univerſe, it may be attended with fatal conſequences: the degree determines the utility; that which when moderate is the ſupport and preſervation of all things, when exceſſive is their deſtruction.

We are not here to enter into the effects of heat in the condition of actual fire, which diſſolves, diſſipates, or deſtroys all known ſubſtances; but that degree of it only, which may be in the air. The farmer will not bring metals to the furnace, nor expoſe gold or diamonds to the power of great burning-glaſſes, which in their full force ſcatter the one, and ſplit the other to ſhivers: theſe are the amuſements of philoſophy; we are concerned only with its uſe. We ſhall confine ourſelves to the nature and effects of that degree of heat which is at times felt in the air, and to its influence upon the cattle and produce of the ground: and as we limit this work to the ſervice of the farmer, we ſhall advance nothing but what ſtands on certain proof, and what his reaſon will find it eaſy to comprehend.

Our iſland is ſubject in ſummer to very conſiderable heat, when accidents conſpire to continue it unallayed. Nature has ſo well adapted the creatures to this, that they are none of them deſtroyed; nor the ſmalleſt plant, unleſs irregularly expoſed to it: but its effects are very hurtful, though not ſo great as utterly to kill them. We ſee cattle fainting and loſing their fleſh, and plants fading and drooping, according to the degree of the heat; and this the farmer is with his care to prevent, by ſhade and ſhelter for the one, and by watering the other.

Many plants, and moſt animals, bear the effect of cold better than that of heat, for this reaſon, that the cold only condenſes their juices, whereas the heat diſſipates them. The effects of this temperature of the air are more ſenſible on plants than animals; wherefore we ſhall principally conſider them in that light. Many plants will grow in a very conſiderable degree of cold: but when it comes to freezing, though a multitude keep alive, yet few have the vigour to ſhoot. The ſlighteſt froſt ſtops the growth of moſt plants, and a degree ſomewhat ſtronger ſtops that of all.

This is a principle perfectly eſtabliſhed by experience, and the farmer will learn from it what he is to expect with regard to his winter crop. Young plants ſuffer more by froſt than thoſe ſomewhat advanced in growth; therefore let him provide for ſuch as are to ſtand the winter accordingly, and expect from them nothing but what nature will ſupport. Let him ſow them at ſuch time in autumn, that they may have ſome ſtrength before the coming in of froſts; and let him expect little more from them during winter, than to eſtabliſh themſelves well in the ground. What little ſhoots they can make, muſt only be during the open weather; and theſe will be ſo checked by the return of the froſts, that there cannot be any great progreſs.

As nature has provided for ſupporting the generality of perennial plants alive during the coldeſt weather we have in this iſland, we are to be under no farther concern on that head; but to examine the various degrees of warmth and heat; riſing from this, to the extream of what our ſeaſons afford. The warmth of the ſofter winter months brings plants a little forward; the gentle heat of the ſpring makes them ſhoot apace; the greater heat of ſummer ripens their flowers and ſeeds; and even the greateſt, as we have ſhewn, is not enough to deſtroy them, unleſs the negligence of the huſbandman join with it. A gentle warmth puts the ſap of plants in motion; and the greateſt power of it within moderation, unites and cements their beſt juices for the formation of their moſt uſeful products: but when we come to a degree conſiderably greater than this, it operates in a way directly contrary to what we have named, ſeparating and diſperſing their beſt particles, inſtead of bringing and uniting them together. It is therefore a plant puſhes out its flowers, and ripens its fruit or ſeed in this moderate degree of heat, but in the extream it fades and decays.

Many a crop that might have produced very well is loſt, or comes to little, for want of the farmer's proper aſſiſtance. Different ſoils and different ſituations make plants bear heat differently, ſome better, others worſe; as alſo their ſeveral kinds. We have told the huſbandman what ſpecies ſuit what ſoils and expoſures beſt, having always kept this article of heat in mind; and with proper regulation there is ſcarce any ſuch thing as a crop's utterly failing this account. When we conſider how much hotter ſome countries are than ours, this will appear leſs ſtrange; for there are plants which live in the hotteſt of them.

Experiment ſhews, that plants will endure without prejudice a greater degree of heat, than that of water made as hot as that a perſon can but juſt endure to hold his hand in it without ſtirring it about. This Dr. Hales proved: he has therefore fixed upon a larger degree of heat than this for the utmoſt which plants will bear, and aſcertains it at that heat of water upon which melted bees-wax begins to harden.

This is an experiment happily choſen, ſince bees-wax being a vegetable juice, ſuch a degree of heat as would abſolutely diſſolve that, muſt be the utmoſt point plants can bear. This explains to the farmer how much his own neglect is to be blamed at many times, when he gives up his crop as ſpoiled by heat: this is a degree to which plants never will be naturally expoſed with us: therefore he may for his ſatisfaction eſtabliſh this maxim; that if he conduct himſelf properly in the ſowing and management of any crop, it will never be loſt by means of heat.

If a weather-glaſs of the common make be divided into a hundred parts from the degree of cold at freezing, to this degree of heat determined by the melted wax, it will give all the degrees of heat to which plants will ever have any reference. Few houſes are without a weather-glaſs, and the farmers never ſhould. The kind made for this purpoſe is that called a thermometer, and the huſbandman will do well to have one with this diviſion, which will come as cheap as any other. This will ſhew him at all times what is the degree of heat in the air, much better than what he feels at random by his body; and according to this he will know in what degree of health, or in what danger his crops are from this article. In a ſpace thus divided, ſixty-four degrees is about the heat of the blood in animals. Experiments have ſhewn, that the heat of the external part of the body is that of about fifty-four of theſe degrees: the heat of milk as it comes from the cow is fifty-five degrees; which is about the ſame that ſerves for the hatching of eggs; and that of new made urine is about fifty-eight.

Theſe degrees of heat being known, with reſpect to the parts and bodies of animals in health, give us a mark by which to know their ſickneſs; and the compariſon of what degree of heat our ſummers commonly afford, with what plants will bear, which is perfectly known by this method, will farther confirm to the farmer what we have aſſerted already, that when his crops fail, as is ſuppoſed by heat, it is not by the abſolute effect of that, but by his miſmanagement joined with it. The common degree of temperate weather in this diviſion is about eighteen degrees; and the great heats of ſummer will raiſe it to eighty-eight. This is a vaſt advance; it is four and twenty degrees hotter than the blood of animals naturally ſhould be: but even this, tho' without care it will make cattle faint, and expoſe them to diſorders, yet is no leſs than twelve degrees below the extreme heat that plants will bear without prejudice, if properly managed.

There are countries in which the plants all endure this degree of heat, and more, many months, for ſeveral hours each day; but what is ſeen in them verifies what we have told the huſbandman. They hang their leaves and fade, and would be killed by it, but that they are ſupported and refreſhed by the great dews of the nights in thoſe places. Nature has for this reaſon made many of the plants of thoſe hot regions of ſuch a form, that they have no leaves; theſe being the part that ſuffers moſt readily by the violence of the heat.

Though we have named the height of eighty-eight degrees, as what the weather ſometimes arrives at in our ſummer, the farmer is not to imagine that every ſummer is ſo hot; much leſs that every plant muſt of neceſſity be expoſed to ſuch a degree. The common heat of a ſummer day in the hotter months, and in the middle of the day, is about fifty degrees. There is a great deal of difference between this and the heat marked at eighty-eight, which yet is twelve within what plants may bear. But this is a degree of heat to which his cattle are not expoſed, tho' a great many parts of his crop are. At thoſe times when the heat is at fifty degrees in the ſun, which is to be called a ſummer noon-tide heat, it is but thirty-eight degrees in the ſhade. The farmer ſhould carefully obſerve this article, that he may ſee what a vaſt deal is in his choice by a proper management. 'Tis true that the great heats of ſummer ſubject his cattle to many diſorders; but he ſees here, that it is in his power to moderate that heat twelve degrees in fifty by a proper ſhade.

Motion encreaſes heat to a great degree, therefore let him take care, that when the days are hotteſt his cattle are kept the moſt quiet. In the ſame manner, as the middle of the day is the hotteſt part of it, let them be kept particularly ſtill during that time. Theſe are rules founded on plain reaſon and daily experience, yet plain and obvious they are not ſufficiently regarded. The huſbandman may, by an irregular proceeding, heat his cattle as much in May, as the nature of the ſeaſon would do in July: and on the other hand, by proper hours of reſt, and due ſhelter, he may in the effect reduce the moſt extreme ſultry weather to the condition of temperate.

With reſpect of plants, an obſervation of the degree of heat, and of their general condition and progreſs, will ſhew the truth of what was before aſſerted, reſpecting the effect of a moderate heat for promoting their growth, and the effect of a greater degree of it in ripening their ſeeds. At a medium the heat is in April, at about fifteen degrees. This with the aſſiſtance of the rains at that ſeaſon, ſets the plants to ſhooting. In May and the beginning of June it advances from that to twenty, twenty-five and thirty degrees; and in this time they grow moſt, and ſtrengthen themſelves beſt. After this come the more extreme heats, and the ſeed ripens. The degrees of heat between twenty and thirty, are moſt ſuited to the growth of plants. The common heat of the beginning of ſpring, and the decline of autumn, may be reckoned between ten degrees and eighteen; and the winter heat within ten degrees of the freezing point.

CHAP. II.

Of drought, its nature and effects.

WHEN the ſummer months beſide being extremely hot are alſo dry, the farmer's crop ſuffers greatly, unleſs well aſſiſted by art. In the hotteſt countries there are the largeſt dews; and in our hotteſt ſeaſons the greateſt quantity of moiſture is exhal'd from the earth, and ſerves to refreſh the herbs again in its fall; but it is not enough. Nature intended them the aſſiſtance of rains, and when theſe are with-held, the huſbandman muſt ſupply the defect by his induſtry. The products of open field land are moſt expoſed to drought, and corn more than paſturage; yet none are exempt. In ſeaſons ſlightly droughty the open field corn ſuffers, and the farmer reaps a poor harveſt; and in the extream there is little graſs.

The ſtock ſuffers by means of the ſcarcity of food; and there is want of water at the ſame time. Theſe, added to the diſorder of their bodies from the heat itſelf, are ſources of many maladies; ſo that it is a very important concern to the farmer to make the beſt proviſion againſt the damage that he can, and to do all he can to remedy it when it happens.

The method is pointed out by nature: indeed the huſbandman's whole practice is ſo, if he would follow her ſteps. Let him ride about the country in the extreams of a droughty ſeaſon, and obſerve the effects of it on lands that lie differently. It is in open fields the effect is worſt; and in others he will ſee the damage leſs as the encloſure is better. This may ſhew the proper guard againſt drought, is by keeping up fences, and planting them well with trees. We before recommended this upon the conſideration of its advantage in wood: here is another and a very great one. The effect of the warm ſun upon plants of the ſame kind in open grounds, is ten times greater, than in ſuch a one as is well encloſed: we have ſhewn its heat is greater, but that is not all; droughty ſeaſons are attended with burning winds: theſe parch up the plants which the heat only faded; and againſt theſe three cauſes of miſchief no common plant can well ſtand. 1. The heat evaporates the juices. 2. There is no recruit from ſhowers. And, 3dly, The dry winds follow, to ſhrivel up what the ſun had faded. The leaves wither and droop, and they muſt fall off. We have ſhewn what are the uſes of leaves on plants; and it is plain the loſs of them muſt be deſtructive.

Expoſure to drying winds compleats the deſtruction of plants; therefore the farmer is to guard againſt that. The elements will not obey his pleaſure, but he may defend his crop from winds. The ſun will dart its rays in ſpite of all his caution; and there is no art by which he can make the clouds drop their treaſures of water: to theſe therefore he muſt ſubmit; but the miſchief of theſe is ineffectual without the winds that follow: and he can guard his crop againſt them. Let him thicken his hedges at the bottom, and plant trees in abundance, that will grow to a height, and almoſt meet by their branches all the way up. This will be a defence againſt the winds, and in ſome meaſure againſt the ſun. The thickneſs at the lower part will break the force of the former, and the large ſhade ſpread over the field for a great part of the day, will defend the growth againſt the latter. The plants thus ſheltered will enjoy a ſtate of the air by many degrees cooler, than if the ſun had its full effect: the trees will, by the great quantity of watery matter they perſpire, render the air leſs ſcorching.

The profit of wood will recommend this method, for it is very conſiderable: on all accounts we adviſe the farmer to fall into the practice, but ſtill within the guidance of moderation; though we adviſe him to thicken his hedges about thoſe places, where from the ſituation drought is like to be moſt deſtructive; yet we mean this ſhould be done in a prudent manner. The larger the field the loftier ſhould be the trees. For ſmall encloſures a well grown white thorn hedge, is a ſufficient defence: in thoſe of a larger extent the pollard hedge will be moſt proper; and for the largeſt, tall elms, which are to be indulged in ſpreading out their ſide branches, provided they do not over-hang the ground.

We adviſe the farmer to imitate the practice of the gardener in cutting of thoſe trees, which he means ſhould grow fan faſhion. Let him cut off the boughs of elms that grow toward one or the other field, and encourage ſuch as run parallel with the courſe of the hedge. The ſide boughs will thicken, and be a better ſhelter, and the growth will ſuffer nothing from their overſhadowing or drippings. There muſt be always a leading ſhoot left for the top, to carry up each tree in height, while it is ſpreading breadthwiſe; and then with all the advantage there will be a great deal of beauty. This is not to be conſidered by the huſbandman, at the expence of convenience, but when it falls in with that, 'tis worth regard.

CHAP. III.

Of the care of the fields in the management of ſhelter.

THE huſbandman will ſee we have contrived for him an eaſy, and effectual remedy againſt the principal danger from drought; but he will obſerve, theſe hedges muſt be cut, and theſe trees lopp'd at times; and it will be natural to aſk, what is then to be the defence of the crop? The improvements introduced of late years into huſbandry, give a great advantage in the variety of crops; and he will find that change in no reſpect more ſerviceable than the preſent.

Some plants will endure drought much better than others; and theſe he muſt contrive to have upon his lands at the time when he is to cut his fences. This will not be difficult, becauſe the cutting is in his own choice; he may not only do it when he pleaſes, but he may know a year or two before hand, and provide accordingly. The deeper plants root the better they reſiſt drought; and the reaſon is obvious, becauſe drought affects herbs only in proportion to their want of reſources againſt it, and theſe reſources are always greater the deeper they are ſought.

Let the huſbandman proportion the growth to the condition of the ſhelter. He will know at what time it will be bare, at what time it will have grown to a moderate defence, and when it will be in its full perfection: therefore let him, againſt ſuch years as the ſhelter will be moſt perfect, ſow thoſe crops that root the moſt ſlightly, for they will leaſt bear drought. The huſbandman's diſcretion will carry him on to ſow, for the time of middle growth of his fences and trees, ſuch crops as require a moderate ſhelter, but will not very eaſily be parched up: but the great conſideration is with reſpect to the years in which the fences will be bare.

Of all plants, ſaintfoin is the deepeſt rooter: therefore let the huſbandman provide a crop of this againſt the cutting of his trees. Let him ſow it early, and as it will enjoy the benefit of the thick ſhelter while young, it will thrive ſo well as to eſtabliſh itſelf in the ground before the lopping. It may then be left to nature: it will ſtand the expoſure; and as it is a crop that laſts ſeveral years, it may conveniently be continued upon the ground while the fences are growing up, and the trees recovering their branches. When they are grown ſo as to afford a good ſhelter again, the ſaintfoin may be broke up, and the ground will be in excellent condition for another crop.

We have mentioned ſaintfoin, but the farmer is not tied down to this only plant, he may take his choice among all the deep rooters. Dry and barren lands ſuffer the moſt from drought: therefore this care ſhould be moſt taken with reſpect to them: the fences ſhould be planted thick, and the trees at ſmall diſtances: we have before given the farmer his choice of ſeveral that very happily ſuit ſuch ſoils. In many parts of the kingdom, ſince incloſures have become more general, lands

that

that were worth little while open, are come to great value by this article. The crops on theſe lands are leaſt able to bear parching winds, and therefore they moſt evidently of all ſhew the effect and benefit of ſhelter; but this effect on them is ſufficient to recommend the practice univerſally.

CHAP. IV.

Of ſuiting the crop to the ſoil, to prevent the effects of drought.

THERE are certain ſoils more ſubject to have the growth damaged by drought than others; and there are alſo certain ſpecies which ſhew the effect of thoſe parching winds, that attend this accident more than the reſt; and that are leſs able to bear it: theſe conſiderations may be of ſervice to the huſbandman, for providing againſt the effects of this temperature of the elements; and ſerve as a kind of general rule for his practice.

We ſuppoſe the farmer ſituated in ſome ſpot where there are the common accidents and common advantages attending his profeſſion; but from thence we ſhall now carry his obſervation to thoſe places where a great deal of the land lies low, and in the way of damp and of overflowing. The ſoil in theſe places is uſually a rich deep mould; and where they have the advantage of any tolerable plantations about them, they are from their low ſituation well ſheltered. In many places ditches are made to ſerve by way of fence. But this is an ill practice on ſuch lands, for they are expoſed to all the damage of parching winds. It is leſs than on dry barren ſoils; but ſtill it is conſiderable. Theſe lands therefore we exclude from the preſent obſervation: we ſpeak of thoſe which lie low, have a rich mould for their ſoil, and have tolerable ſhelter: of theſe there are abundance about the borders of the fens; and if theſe be examined in the years of drought, they will be found loaded with the largeſt and richeſt crops.

Hence a rule of practice is very eaſily to be deduced. If the farmer have ſuch land divided by ditches, and it bears poorly, while he ſees that of his neighbours produce well; let him plant the ſides of his ditches with willows at moderate diſtances, and as they have naturally a naked trunk, let him ſet oſiers between them. The method we have delivered before, and the effect will be very great. The tall heads of the willows will caſt a proportioned ſhade, and the oſiers, which are full of leaves down to the bottom, will keep off the winds. Only particular crops will thrive where the lands lie very low, which is uſually the caſe where there are theſe ditch partitions;

but all theſe will receive vaſt benefit in dry years from this fence.

We have adviſed the raiſing ſaintfoin on ground, that is to be left expoſed by the cutting of the hedges, and lopping of the trees; and we ſhall add, that on this occaſion it is the farmer's buſineſs to ſow his crops removed from thoſe higher and more expoſed fields, upon the loweſt grounds he has; and thoſe which are beſt ſheltered. The ſaintfoin on the expoſed ground will ſo cover the ſurface with its branches, that if a hot and droughty ſummer follow, it will be much leſs affected by it; and the herb receiving its nouriſhment from a great depth, will flouriſh, becauſe the ſun will not have power to affect it, when the ſuperficial part is thus ſheltered; while the high grounds thus ſtand out a year of drought in their moſt defenceleſs ſtate, with a good crop upon them; the lower lands will, according to their nature, yield the beſt crops of all. On the contrary, if an unexpected wet ſeaſon happen, the crop on the high grounds will be the ſtronger and finer for it; and thoſe on the lower grounds muſt be aſſiſted, as we ſhall ſhew when we come to that head.

CHAP. V.

Of the effect of drought on trees, and the way to defend them from it.

TREES are affected greatly by drought; but it is only while they are young: they are at that time deſtroyed by it more eaſily than plants of the herbaceous kind; but when they are eſtabliſhed in the ground, they remain unhurt by its utmoſt violence. In this experience confirms the effect of drought, upon deep and ſhallow rooted products. The principal power of this accident is on the ſurface of the ground; and when the root of any thing pierces to a proper depth, the whole remains unhurt by all that happens above.

We have recommended planting of trees in waſte grounds and in hedges, and we ſhall here obviate the great diſcouragement attending that practice, which is the frequent failing of the plantation from drought.

We have mention'd accidents of wind and the like, with the way of guarding againſt them: theſe deſtroy many trees, but drought more than all: and this eſpecially where the plantation is made on an expoſed barren piece of ground. Theſe are places where trees would be moſt deſirable, but from the frequent failure of them farmers have entertained a notion they will not grow there. That nature can raiſe and ſupport them in ſuch places is evident, becauſe we ſee them wild and of fine ſtature, though it is ſo difficult to make them thrive when a plantation is intended on ſuch ground.

Let the huſbandman imitate nature. Let him ſow the trees, and not plant them. And as we have told him what is the great cauſe of their failing, let him guard properly againſt it. The practice of laying ſtones or rubbiſh about the roots of new planted trees, is very good, and may be alſo uſed for thoſe raiſed from the fruit; but we have preſcribed a method for the ſecuring ſmaller crops from drought, which may be transferred to theſe with advantage. It is eaſy to ſow ſomething for ſhelter at the ſame time with the tree, and they will riſe together.

Every ſhrub for ſhelter will not thrive upon barren grounds, but there are enough that will. A poor ground in an expoſed field is the proper ſoil for furze. This will grow from ſeed in theſe places, and nothing can be more proper for the ſervice. When the huſbandman ſets about a plantation on this kind of ground, let him, at a diſtance round every ſpot where he intends a tree ſhall ſtand, ſow a good quantity of furze ſeed in a circular trench. This will defend the young ſhoot of the tree from winds, and alſo from cattle. By this contrivance the ſhoot will riſe proſperouſly, and when it is out of danger the furze may be cut up for uſe. Thus will a fair plantation be raiſed; and it will ſucceed in the ſame way as thoſe which are eſtabliſhed in like places naturally. They have riſen from ſcattered ſeeds or fruits, and have ſtood their chance, and throve even without thoſe advantages.

If, after the furze is removed, the trees appear not to thrive well, from the heat and dryneſs of the ſeaſon, and from the expoſure, let the farmer order a bank of earth a foot and a half high, and a yard broad, to be raiſed round the bottom of every one of them, and they will immediately revive; this preſſes and ſtrengthens the earth about their roots; and it gives them, in ſome degree, the advantage of deep rooting, which is the greateſt of all defences againſt drought.

CHAP. VI.

Of preſerving water for cattle in ſeaſons of drought.

WHILE the crop ſuffers by the want of rain, the ſtock of the farmer will be endangered by the drying up of the reſervoirs of water: the utmoſt care is to be taken to preſerve what there naturally is; and to obtain more from other ſources. The common watering places for cattle, where there is not the advantage of brooks and rivers, are pits, dug purpoſely, which receive the rain of the wet months, and preſerve it during ſummer. Let him clean theſe at proper times, that there may always

ways be a due depth for receiving the water. The mud thrown out will pay the labour. Let him examine whether they be well ſituated, and of ſufficient bigneſs. If they are not in the beſt places let him have others dug; and if they be too ſmall, let them be enlarged. The obſervation of one dry ſeaſon, will inform him.

When pits are well placed, and of a due ſize, let him obſerve how they hold water. If they become dry in the time when they are moſt wanted, let him grudge no price in fitting them for the purpoſe. There are two ways of a pond's loſing its water, and they are equally miſchievous, but equally within the reach of remedy. It may be loſt through the bottom, or evaporated from the ſurface, or both may conſpire to drain it.

Let the farmer provide againſt both, and examine whether one or the other, or whether both be in the cauſe; and apply his remedy accordingly. Let him obſerve how thoſe ponds are conditioned that hold water beſt, and imitate by art what he ſees in nature. When he caſts his eyes about in a dry ſummer, he ſhall ſee many of the largeſt ponds dry; and many a ſmall hole well ſupplied. Some old ſallow, or other ſuch tree, grows at the edge, and under this the water keeps quiet, and freſh in the greateſt heats. Let him examine the bottom, and he will find it clay; or if otherwiſe a coat of ſtiff mud covers the proper ſoil, and anſwers the ſame purpoſe. A ſound bottom and a covered ſurface are the two great articles for preſerving water. Let him, in all new ponds, clay the bottom, unleſs they be dug in natural clay; and in old ones, repair their bottoms, or coat them altogether freſh. If a good clay be uſed, and careful people employed, the remedy is abſolute, for a bottom of this kind will hold as well as one of lead.

When the bottom is taken care of, the next attention is on evaporation. The ſun dries up ponds very much; and the winds more. In their pits in France, where they evaporate ſea water for making bay ſalt, they find one day's ſun, with a briſk wind, takes off more of the water, than three days of the ſame bright ſun in a calm.

The ſame precaution that defends the water from one of theſe, preſerves it from the other; this is the ſheltering it at the edges. Let the farmer keep in mind the old ſallow, which he ſees over the pond that retains water, while others are dry. Let him plant all about his new made or new bottomed pond, except in one place, which is to be left free for the cattle; or if it be in common to two fields, which is a very good practice, let him make two ſuch openings. Let all the reſt be ſheltered with any of the trees that will thrive in a wet ſoil;

none is better than the ſallow, for it grows quick, and its leaves do not give an ill taſte to the water. The boughs, as they grow, ſhould be made to ſtretch and meet from the two ſides, over the deepeſt part of the pond. The ſun will thus be kept off, and the wind will have no power. The water will be kept in, and will be clearer than when it is diſturbed by every blaſt.

If there be any where, in the adjoining ground, a ſpring, that ſhould always be brought in, and a good conveyance made for the waſte water; the conſequence will be, that there will be a conſtancy of freſh water, and yet the ground will be kept dry. The frequent rains with us make people neglect the care of theſe reſervoirs of water too much; but in other countries they are extreamly nice about it, and if we took their example, many of the diſagreeable conſequences of drought would be prevented. When the farmer makes a new pond, or new clays the bottom of an old one, let him be careful to do the work well: for if there be the leaſt defect, nothing will do but new working over the whole. For a new pond, one coat of clay, of eight inches well ram'd, and another of ſix inches, covered with rough ſtones, is the beſt method. For the new bottoming an old pond, a ſingle coat of clay, and the covering of ſtones, will anſwer the purpoſe.

CHAP. VII.

Of obtaining ſupplies of water when the common ponds are dry.

AS common ponds will be exhauſted in a ſeaſon of drought; and the better will ſometimes fail; it is needful to conſider farther what may be done in ſuch extremity; for a ſupply muſt be had ſomewhere, or all will be loſt. Thirſt to cattle is more terrible when in the extream, than hunger.

We have mentioned, the taking advantage of ſprings when they lie near the ſurface: they always may be had at greater depths; and this is the proper reſource. Wells muſt be dug in fit places, when all other ſupplies of water fail. It is often a diſcouraging thought, to conſider to what depths it may be needful to dig for water: but there is abſolute neceſſity of the water, and a certainty of the ſupply: for water may be had any where, if the expence of digging be not ſpar'd. There every where run courſes of wet at different depths, uſually near the ſurface, wherever they lie they muſt be found on theſe occaſions, or all will be loſt.

When the well is deep, and the ſupply that is required from it is great, there muſt be proper contrivances for getting it up. Men may be employed to draw it from ſmall depths, and in moderate quantity; but where more labour is required an aſs may be uſed, or where there is need, aſſiſtances may be employed from the principles of mechanicks. The wheel in which a beaſt walks to raiſe water from a deep well, is a very good contrivance: a double wheel, with coggs, is another method; it makes the draught eaſier than in the common way. The double wheel, with a long line to the hand, is alſo another improvement, becauſe the weight riſes eaſier.

Where there is a large ſtock to be watered, the common ſmall buckets are not to be uſed; in proportion as larger are required, and the weight to be drawn up is encreaſed, the more needful it is to be careful of the force and aſſiſtances in drawing. A good way of drawing great quantities up with expedition, is to place a large wheel at the end of the windlas, four times the diameter of the windlas. A thick rope is to be faſtened to the bucket; and a ſmaller of due length to be wound round this great wheel. The length is to be ſuch, that when the bucket is in the water, the ſmall rope is all wound upon the great wheel, and the bucket being filled, a ſervant is to take the end of this ſmall rope and go forward, till, as that unwinds, the bucket is drawn to the top. A ſingle man will thus be able to draw up a bucket of twenty or five and twenty gallons, with great expedition, and little labour.

Theſe large buckets may be made ſo that they ſhall fill without turning ſideways. A large hole is to be made for this purpoſe in the middle of the bottom of the pail, and a cover is to be fitted to it in the manner of the ſucker of a pump. As ſoon as the bottom of the pail reaches the water, the hole will open and the bucket will preſently fill; then, as ſoon as it is drawn out of the water, the cover ſtops the hole and it comes up ſecurely. This prevents the ſinking of the bucket, and a great deal of trouble. Any wheelwright will be able to make ſuch a wheel, and it will be a good method to form it with teeth, and with a ledge of wood ſo falling upon it, that as the ſervant moves forward in the drawing, nothing ſtops the pail; but as ſoon as it is high enough, the ledge of wood bearing againſt the teeth, ſtops it. The ſtructure of a common jack wheel will explain this eaſy piece of workmanſhip.

The way to be moſt expeditious in raiſing quantities by this method, is to have a receiver for a great deal of water placed ready near the well, and a trough long enough to reach from the ledge of the well to it. This trough is to be placed under the bucket, and it will be eaſy by faſtening a cord to the cover of the hole within the bucket, to pull it up when the trough is ſet under; thus the bucket will both fill and empty without turning down. Where ſuch contrivance is wanting, let the huſbandman ſee if there be no place in the higher ground where the water is detained. Ponds on the tops of hills are not uncommon, and where there is water above, it is eaſily brought down to be of ſervice. His care ſhould be to keep the pond at the top well ſheltered and well bottomed, that all that comes to it may be preſerved in it, and then pipes are to be laid from this to the place where water will be moſt needed. One ſhould be always carried to the houſe, and another to a place where the cattle may be conveniently watered. Thus will a ſupply be often preſerved, when all others, except deep ſprings, fail; and in this way there is nothing of the trouble of drawing up and emptying, as in the others.

It is frequent that ſprings riſe on the tops of hills: theſe will fill ſuch ponds, and afford a laſting reſource: but without theſe the aſſiſtance of ſuch a ſupply is very common. I ſhall refer the reader about London to one familiar inſtance. On the right hand ſide of the road to Harrow, about a mile from Paddington, is a very conſiderable farm occupied by Mr. Godfrey. It is near the top of the hill. After a few more paces you arrive at the top, which is a flat of no great extent: there is a little ſinking in this ground toward the middle of the flat, and in that place is a large round and deep pit. This is always well ſupplied with water; and from this Mr. Godfrey has pipes laid, which go to his houſe, and afford a continual quantity for all needful uſes. At firſt ſight a perſon might imagine there was a ſpring in this place; but I have examin'd and found it otherwiſe. The ſoil is all a hard firm clay: by this means the pond is well fenced to keep water, and its depth to the ſurface ſhelters it very well from the wind. It receives the water no other way than from the rains that fall upon the flat, at the top of the hill: but the ſoil there being all the way clay, it takes almoſt all that falls on the ſurface. Very little is abſorbed by the thin coat of mould which covers the clay, and the reſt ſinking toward the pond, is received into little covered drains, that diſcharge themſelves into it.

Nature has, in many caſes, given the ſame opportunities of ſupplying a farm; it were well if others had made the ſame advantage of them. It may often be neceſſary to bring water up from a lower place, when the cattle cannot of themſelves get at it. In this caſe recourſe is to be had again to mechanicks. There are various ways of getting water from below, ſome ſuited to larger and others to ſmaller purpoſes, the moſt convenient will be the Perſian wheel. This is conſtructed at a moderate expence, and will laſt a long time: and the quantity it will raiſe is ſufficient for all poſſible purpoſes in the ſervice of the largeſt farm.

CHAP. VIII.

Of the ſigns and notices of drought to be obſerved by the farmer.

AS a continuance of dry weather is the ſource of this terrible calamity to the huſbandman, it will be of uſe to him to make a rational gueſs, whether the dry weather that at any time alarms him is or is not likely to continue. We ſmile at the common prognoſticks of weather; and acknowledge thoſe which are better founded are uncertain: we could therefore have gladly dropped the entering upon the ſubject, but that we think it may be of real ſervice to our readers; therefore we ſhall lay down ſuch obſervations, as are moſt likely to inform the huſbandman what he is to expect; cautioning him never to have recourſe to them but in continued dry ſeaſons, and then to judge of them as we deliver them, not as certain, but in ſome degree probable; accepting them as the beſt guides he can obtain, and therefore conſulting them for want of ſuch as would be leſs dubious.

Birds, beaſts and fiſhes are warned of changes in the air, by notices that either do not reach us, or what we do not regard. We ſee in the weather glaſſes alſo the great effect of changes in the air; and we perceive it in many other natural inſtances. Theſe ſhew that changes of this kind affect both ſolid and fluid ſubſtances; and therefore that we may ſeek for them, and obſerve the marks of them, as notices of ſucceeding changes or continuance of weather in almoſt every object that is before us. In things inanimate we can only perceive them by examination. A board will ſwell againſt rain; but if we do not obſerve and examine it we ſhall not ſee it: in living creatures their actions ſhew what they feel; their bodies are affected by the changes of the air, and they are guided by inſtinct, more certain than reaſon: therefore we may obſerve their actions as prognoſticks of what will happen.

Theſe creatures are the moſt ſenſible of changes in the air, becauſe they live expoſed to it, and can feel no changes but what are natural: mankind who live in houſes alter the temperature of the air by fires, and are by that means made incapable to judge of its real variations. The change from the air of a room with a fire, to that of a field or garden, is ſo great, that it quite drowns the ſmall variations which may have happened in that free element. For theſe reaſons other creatures are more ſenſible of theſe changes than we; and as they have motion and voice, we are to watch both for the finding out their nicer feelings.

In danger of drought, if there be herons in the neighbourhood let him obſerve their courſe. This bird delights in a lofty flight, and will indulge itſelf in it, when opportunities of ſatisfying its ravenous appetite do not call it lower. When the heron flies high in the middle of the day, it is a ſign the dry weather will continue. The food of this rapacious bird is principally ſmall animals that haunt about the waters. Fiſh are its delight when it can catch them; but they are too ſwift in their motions for its general ſupply: frogs, black ſnails, and other ſuch creatures, are its common prey. The dews of the night call out theſe early in the morning, and this is the heron's time of preying. When the earth grows dry, and the ſun hot, they retire into their hiding places, and the bird indulges himſelf in his airy flights. This is his cuſtom in dry weather: but if there be a change for rain, theſe inſects feel it, and they crawl out of their holes by day. The heron feels it alſo, and inſtinct guiding him, he deſcends in ſearch of them: his flights are low, and he is frequently ſtooping. Upon this principle depends the ſign of drought from the heron's flying high; and it is one of the moſt certain that are to be gathered from the bird kind: but it is not on any one of theſe the farmer is to build his opinion: things doubtful are no way ſo well confirmed, as by being ſupported one from another.

All beaſts are rendered faint and languid by a continuance of hot dry weather; and while they continue ſo, 'tis a ſign the cauſe will continue. The farmer ſhould watch the actions of his ſtock, while they ſeem inactive and dull; while they riſe late to their food, and eat it careleſsly, it is a ſign the drought will continue. They feel the firſt approaches of rain; and the farmer may know it will happen by their conduct. After a long ſeries of dry weather, ſheep will riſe an hour before their time to feed: when rain is coming they and all the other cattle will feed heartily: their motions will be briſk, and the cows and the oxen will toſs up their heads and ſnuff the air with pleaſure.

When the farmer has theſe notices of rain from the bird and beaſt kind, he may give up his fear of drought. Many more might be named, but theſe after a long drought are certain. To theſe ſigns from the birds and beaſts we may add ſome from fiſh and inſects: they are not of equal certainty; but they will ſerve as a confirmation of the others.

If the farmer has a pond with fiſh, let him look into it carefully. If his fiſh keep out of ſight the drought is likely to continue: if they come up to the ſurface after diſappearing many days, he may imagine there will be rain. Fiſh love air, but it muſt be a moiſt air; and they feel it under water.

This is another though a leſs reaſon of the heron's leaving his high flight when rain is coming. He has no chance for fiſh while they keep in the deep water; but when they riſe in the ſhallows he may ſurpriſe them. Eels keep all day under the mud in dry weather; but they will put up their heads on the approach of wet, and ſometimes crawl on the ſurface. Added to inſtinct here may be the aſſiſtance of eyeſight. The ſportſmen know from what a height hawks will ſee: the heron has eyes of the ſame piercing kind; and the ſight of fiſh riſing to the ſurface, and frogs crawling out of their holes, may bring this bird down, as well as the guidance of inſtinct upon his feelings. In long droughts worms penetrate deeper into the ground, for they muſt have moiſture: their ſkins dry up when expoſed to a parching air. In theſe continuances of dry weather they rarely come abroad: and while the farmer ſees nothing of them or their caſts upon the earth, he has reaſon to fear it will continue.

There yet remain obſervations on things inanimate on earth, and in the ſkies. When the wood-work about his houſe and yard moves looſe and eaſy, and the more coarſe works rattle in the joints, it is a ſign dry weather will continue; and when the ſurface of marble or ſmooth ſtone in chimney pieces and floors is perfectly dry, it is alſo of the ſame purport. We ſpeak of rooms in which there are no fires. Let the farmer obſerve the ſun at riſing: if he riſes ſmall and blue, too bright to be looked upon, and in a clear ſky, there is the appearance of a continued dry time. When there are rainy vapours in the air, they enlarge his apparent bigneſs, and ſhew him of a fiery colour. At night let him watch the moon and ſtars: if they are bright and clear, there is reaſon to believe the dry weather will continue. If the horns of the new moon look particularly ſharp, that alſo is a ſign of its laſting. The clouds may give ſome ſigns of drought alſo; though from their fleeting and inconſtant nature, leſs dependance is to be placed on them than on the other tokens. If the ſun ſet red, that is, if there be a light red ſky in the weſt at evening, it is a ſtrong ſign of the continuance of dry weather; eſpecially if the eaſt be free from clouds at the ſame time. When only a few light looſe clouds are ſeen in the weſt at ſun-riſe, and they ſoon diſperſe, it is a token of the continuance of the dry time.

The laſt thing to obſerve is the wind: the north and the eaſt are the fair weather winds in England; the ſouth and the weſt thoſe which bring rain. When the wind ſeems ſettled in one of the dry quarters, or in changing goes only toward the other, there is the probability that he is to expect a ſeaſon of drought.

There are leſſer obſervations to be made for the foreſeeing ſudden ſhowers and days of clear weather in the common changeable courſe of things: theſe we ſhall treat of under the article of rain; but in this place we are conſidering a thing of much more importance than thoſe ſudden variations.

CHAP. IX.

Of rains.

WE are talking of the extreams of thoſe things, which are in themſelves, when moderate, of the utmoſt advantage: heat was the laſt named, and moiſture is to be treated of in this place. Both are needful to the growth of plants; they are indeed the two great requiſites to that purpoſe: but both may be deſtructive to the crop and ſtock of the farmer. The beſt things when improperly conducted may be the worſt; and it is in nothing ſo evident as in theſe articles. All lands receive damage by exceſſive rains; but thoſe moſt which lie loweſt. From theſe it is neceſſary to remove them, or they become ponds or bogs.

Every piece of ground has ſome deſcent: the farmer's buſineſs is to find that; to cut channels for the reception of the abundant water, and to lead them according to that deſcent to diſcharge themſelves at the loweſt place. Beſide the damage that may ariſe by heavy and continued rains of winter, there are ſeaſons at which every ſhower may reaſonably alarm him. Theſe are particularly the times of hay making and harveſt. For the ſucceſs of theſe operations he is to ſeize upon every good hour that comes; and it will be of importance to form ſome conjecture what weather is likely to follow. It is a matter of indifference whether he bring the ſcythe into his meadow, or the ſickle into his field, one day or another. There is a time at which the graſs has moſt ſubſtance, and when the grain is richeſt in the ear; but this is not limited to a day.

The farmer may be tempted by fine weather to begin both ſomewhat ſooner than he intended; and he may, on the threatning preſages of rain, defer them ſome days. As it may with ſome tolerable degree of certainty be foreſeen, we ſhall give all that have reaſon for their foundation. We ſhall ſelect thoſe ſigns for which there is foundation in the laws of nature, and which we have experience to confirm; paſſing lightly over the others, and utterly rejecting the fancies of weak and credulous people, which have too long impoſed upon the injudicious.

CHAP. X.

Of the ſigns and notices of rain to be obſerved by the farmer.

THE oppoſites to all thoſe things we have nam'd as ſigns of drought are notices of rain: when the heron flies low; when the cattle riſe early to their eating; when fiſh ſwim on the ſurface of the water, and worms crawl frequently out of the ground; when wood ſwells, and marble is wet; when the ſun looks big at riſing, and the moon and the ſtars appear dull; when looſe clouds fleet about the weſt in a morning, and do not diſperſe as the ſun advances againſt them; and when the wind is ſouth or weſt, and changes only from one to the other of thoſe quarters, rain is to be expected.

Birds feel the approach of rain with pleaſure: a moiſt air ſeems beſt ſuited to their nature, and particularly to the water-fowl. It alſo brings out of their lurking-holes the myriads of inſects which are their food. If geeſe and ducks prune themſelves, ſeem more than ordinary chearful and lively; and the crows in their hoarſe voice caw from the tops of the trees, he is to underſtand it as their rejoicing at a damp air, and the approach of rains: theſe laſt are extremely ſagacious. When they fly about toſſing up their beaks, and are very noiſy, the rain is coming: and when they ſtalk by the ſides of brooks and ditches, it is near at hand.

When ſwallows fly low it is a well known ſignal of rain, and is founded on the plaineſt reaſon. The food of theſe birds is little flying inſects, and all theſe unable to bear up againſt the weight of the air when loaded with damp, fly low. The crying of peacocks is another known ſign of rain: it is that bird's note of joy. His voice is hoarſer than the crow's; but it is a ſign of his ſatisfaction.

Sheep ſhew the firſt ſigns of the approach of rain; it makes them ſprightly: they leap about and play with one another. The aſs foretels it by his braying, which is alſo his note of ſatisfaction; and the cows and oxen by toſſing up their heads and licking their ſnouts.

Theſe are the ſigns of rain gathering in the air; but when it is juſt at hand cattle give other kinds of notice. They flock to the hedges, and ſeek ſhelter under trees.

Inſects may be of uſe this way to the farmer; their tender bodies give them notice of the changes in the air long before men perceive it. The bees keep within their hives, and the ants leave their buſy motions, and retire deeper into the ground.

They carry with them thoſe caſes in which the winged ſex are lying for their change. Theſe common people call their eggs; but that is an error.

From the animal kind we ſhall lead our farmer for preſages of wet to the wild weeds of the field, and to the common products of his garden. The poet ſpeaks of the cloſing of the flowers of common marygold at evening: he calls it

The marygold that goes to bed with the ſun,

and this, and all the other flowers which have that quality, ſhut up in the ſame manner more or leſs when rain is coming. The flowers moſt newly opened, have this quality moſt ſenſibly. Dry weather opens them fully; and as wet is nearer or farther off, they draw together their leaves in a more cloſe or looſe manner.

In the corn fields the farmer will meet with a little plant famous for many virtues, its name is pimpernell, he will know it by its ſmall bright red flowers: theſe open in dry weather, and ſhut up againſt rain. Wet may be foreknown a whole day before it falls by this flower. The heads of dandelion gone to ſeed are ſo many globes of down in fair weather; but againſt rain they contract.

Let the farmer look into his clover field, and he will find another mark of rain which has been obſerved theſe two thouſand years: clover, when rain is coming, ſtands more upright and firm than at other times; the ſtalk is ſwelled and ſtiffer. This is true in the ſame manner with many other plants, but in none ſo diſtinctly. Wood ſwells with the wet, and the ſofter kinds moſt. Doors will not ſhut; for both the poſts and the boards ſwell: window-ſhutters ſtick, and boxes are hard to ſhut or open: drawers ſtick in their caſes.

From theſe things let him turn his eyes up to the heavens. The ſun's looking red and large is a ſign of wet; and let him mind the clouds that accompany this appearance, for they will not only confirm that rain is falling, but in ſome meaſure ſhew the time when it will come. If clouds preſently after ſuch a riſing of the ſun gather in the ſky, and the air appears thick and watery, it will preſently rain; and the hotter the weather, the ſooner the rain is to be expected. When at ſun-riſe, or ſoon after, there is a circle or part of a circle of a blueiſh or whitiſh colour about the ſun, there may be expected rain ſome time within the day. A red ſun at riſing is a ſign of rain; and the ſame is to be added concerning its looking dull and white. The natural colour of the riſing ſun in a clear air is the ſame that it has at noon day, a deep fiery blue, which the eye cannot look upon a moment. When he is dim and faint, and looks white, it is owing to watery vapours, and wet is near.

If the moon have a large circle of a whitiſh colour round her at a diſtance, it is another ſign of rain: and when the ſtars look larger than uſual, and fainter, and twinkle leſs, it alſo preſages wet the next day: this is confined to the fixed ſtars; for the planets, though larger, never twinkle at all.

The clouds give many prognoſtications of wet. When there are ſmall ones ſcattered about the weſt in an evening, rain is to be expected the following day.

The rainbow is not ſufficiently underſtood. It beſpeaks a change: if it appear after dry weather, it foretels a great deal of rain; but when we ſee one after a great deal of wet, we may expect fair weather. A bright rainbow in the eaſt is uſually followed by a great deal of rain.

Miſts from waters afford a regular and certain prognoſtick of the ſucceeding ſeaſon. When they are thick in the morning, and preſently after diſperſe, they are tokens of fair weather: but when they riſe to the neighbouring hills, and hang in the air, they uſually preſage rain, at a day or two diſtance.

CHAP. XI.

Of the ſeveral ſigns of fair weather.

THE ſigns of fair weather approaching are theſe. A clear ſky in a morning, and a bright ſun-riſing in it, are the natural tokens of a good day; and when at evening he ſets in a light and bright red ſky, and without heavy clouds, there is reaſon to entertain good hope of the next. When the moon looks bright and clear, and has no foggy circles round her it is well; but the greateſt promiſe is from her appearance a few days old. Let the farmer, whoſe harveſt approaches, watch the new moon. If he ſee her horns ſharp, clear, and fine, he may reaſonably expect fair weather till her full. The ſtars give the ſame tokens in the ſame manner. When they look ſharp and bright, and twinkle ſtrongly, there is a clear air, and it is like to continue.

White, ſmall, and ſcattered clouds at the north eaſt, are a token of ſeveral days fair weather. Look to the hills, and if their tops be clear, expect bright and ſerene days: even the ſtone and brickwork of buildings, in ſome degree, gives the ſame notice. Theſe are ſeen more clear and diſtinct in the pure air, that brings in fair weather, than in ſuch as is full of watery vapours, and precedes rain.

Light miſts, gathering early in the morning over waters, and ſoon diſperſing, are ſigns of fair days. If a ſhower happen, and there be a rainbow, let the farmer watch it carefully;

if the blue be a ſtrong colour, and the yellow bright, it is a ſign of clear weather quickly following.

When gnats ſwarm in an evening, and the glow-worm crawls abroad at night, good weather generally follows. Theſe tender inſects dread the rain, and hide themſelves when inſtinct gives notice of its coming.

The bee is a ſure director. Her little organs feel the approach of wet; and keep her priſoner in the hive, or limit her to ſhort excurſions when it is near: therefore when ſhe flies far, and returns late, good days are coming. When the kite and the ſwallow fly high good weather is coming. They can ſee their prey to a greater diſtance in that clear air; and they love lofty flights. When the ſea birds leave the ſhore; and when the owl hoots ſoftly, gently, and compoſedly, fine days may be expected.

When roach and dace leap up out of the water, and when the ſpider hangs its light webs in the air, fair weather is coming: experience, more than any certain reaſon, eſtabliſhes this token from the fiſh. As to the inſect, it is plainly the direction of inſtinct. Its tender and expoſed body feels the change of air for dry weather; and inſtinct directs it on that notice, to venture out its threads, becauſe there will be nothing to hurt them.

Laſtly, we ſhall give the huſbandman a notice which he is to regard more than any of the preceding, becauſe it anſwers doubly, as a promiſe of fair weather for the preſent, and a denunciation of rain ſoon after. This is that thick dark ſky we ſometimes ſee for a continuance of time, without either ſunſhine or rain. This is a thing that frequently happens in England about the harveſt: and the greateſt regard ſhould be had to it: it is an unerring rule, that ſuch a ſky is followed by ſome fair weather, and rains come ſoon after. The farmer needs not be afraid of ſudden rain, when there is ſuch a ſky. There will be an interval of fair between, which will ſerve to finiſh his work.

CHAP. XII.

Of hail.

HAIL is more dangerous to the gardener than the huſbandman, whoſe products being at all times expoſed to the weather, are more hardened: when it is very violent, and the ſtones large, it will do him ſome damage; but it is leſs to be foreſeen than any of the other accidents. In the warmer parts of Europe it is terrible to the huſbandman, becauſe the heat brings his crops early, but neither there can he foreſee or guard againſt it. Theſe ſtorms in thoſe countries are leſs frequent than in ours, but ſharper.

The huſbandman in theſe ſtorms of hail is to watch whether they ſeem common; for in theſe there is little harm to him; or whether they threaten to be very terrible: in the latter he ſhould be quick in driving under ſhelter, all ſuch parts of his ſtock as could be hurt; his lambs and other young creatures. His crop muſt take its chance.

As we have endeavoured to make the farmer acquainted, in ſome degree, with thoſe things wherewith he has any concern, we ſhall add here a ſuccinct account of hail.

Rain is water raiſed in vapour by the ſun, and falling again in drops. Theſe drops often paſs through a conſiderable depth of air, before they reach the ground; and it ſometimes happens that they are frozen by the way. A frozen drop of water can be no other than a ſmall roundiſh piece of ice; and hailſtones are ſuch. In particular caſes, hail-ſtones have been of odd ſhapes, as long, or flat and thin, and ſtarlike, but theſe are uncommon. The long and flat ſeem only the effect of various degrees of freezing; but the ſtarlike hail, is of another origin. That ſhape is the natural form of ſnow. Therefore, as the common hail conſiſts of drops of rain frozen in their paſſage through the air; this is compoſed of flakes of ſnow, frozen to the hardneſs of ice, in the ſame manner. Though theſe fall with leſs weight than the others, they are attended with more damage, eſpecially to the gardener; for when they are driven before a violent wind, their ſharp edges cut off the bloſſoms of fruit trees like ſo many knives.

A good practice in gardens is, to ſtick pieces of furze buſh among the branches of the fruit trees: we name this becauſe it may be transferred, if there be occaſion, to the field, if the farmer have any young crop for which he is in fear from hail ſtorms; he may with little expence ſtick up large furze buſhes among it at certain diſtances, which riſing above the proper growth will, by their buſhy heads, defend it from the fury of theſe ſtorms. This is never needful, but upon particular occaſions, and they are not to be foreſeen. The driving in of cattle and poultry is the principal care; and 'tis better this ſhould be done when there was no real neceſſity twenty times, than once omitted when there is.

Miſchievous ſtorms of hail generally are of ſmall extent, and may be foreſeen a little before their coming, by a thick black heavy cloud, with chillneſs in the air and wind. Toward the end of April, in 1697. there was one of theſe in Cheſhire. A black cloud foretold its coming about a quarter of an hour. This was time enough to have got in the tender cattle, but the farmers were not aware of the danger. The breadth of this heavy cloud was about two miles, and the courſe it took before it diſſipated was ſixty miles; along all this tract there was made the moſt terrible havock, but not the leaſt beyond or beſide it. The hail ſtones were as big as eggs, and ſome of the full bigneſs of a man's fiſt. They were pieces of clear, tranſparent, and very hard ice, with a white kernel in the middle, which ſeemed a little lump of ſnow. Some of theſe vaſt hail ſtones were ſmooth, others rough and ſharp on the ſurface. They fell with a prodigious force, and killed fowls, lambs, and calves: beat down the young crops of every kind; and in ſome places, where the wind drove them ſlanting, plowed up the ſurface of the ground, and buried themſelves an inch or two in depth; trees were broke and ſhatter'd to pieces in many places; houſes damaged, and many people that were abroad much hurt.

This, and other inſtances, are not recited here for curioſity or an idle amuſement: they are ſo many leſſons to the farmer: examples of the loſſes others have ſuſtained by neglect of driving in their young cattle; and cautions to himſelf for a wiſer conduct.

There is recorded another hail ſtorm the ſame year much more terrible. It happened in Herefordſhire, in the beginning of May. Thunder and lightening preceded it, and for ſometime continued with it, as alſo a violent tempeſt of wind, that blew both the lightening and hail upon ſeveral houſes, to their deſtruction. Nothing could exceed this but the hail ſent by the Almighty upon the Ægyptians; nor can any words ſo ſtrongly or ſo truly deſcribe its terror, as thoſe uſed on the occaſion in ſcripture, "Fire mingled with the hail ran along upon the ground." In this terrible ſtorm not only fowls and young animals of all kinds were killed, but ſome of larger growth; and ſome labouring perſons in the fields, who could not reach ſhelter, ſuffered the ſame fate; their bodies being black and blue, as if beat to death with clubs. Oaks were ſplit: the branches of many other trees torn down; and fields of rye were, in ſome places, cut down as if mowed off with a ſcythe. The hail ſtones in this terrible ſtorm were of no regular figure: many of them meaſured fourteen inches round *, and they ſeemed fragments of thick ice.

To theſe accounts of hail ſtorms in our own country, we ſhall add two extreamly ſingular in their kind, vouched upon the moſt warrantable authorities: the one of theſe was in Flanders,

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* Philoſ. Tranſact. N. 229.

ders, about Liſle, in the year 1686. and the other in France, in 1510.

In all obſervations of hail ſtorms with us, they have been no other than pieces of ice, with a little lump of ſnow; but theſe had ſulphureous matter either in their center, or in their whole ſubſtance. That at Liſle is recorded in the philoſophical tranſactions [*], the ſtones were not only vaſtly large, but appeared duſky in the center; and ſuch of them as came down chimneys into fires, when the icy part was melted, and this brown ſubſtance was expoſed to the fire, burſt with a loud report. Mezeray, in his hiſtory of France, mentions the other with all its particulars. A black cloud came over the face of the heavens, and darkened the air like night: in the midſt of people's terror and aſtoniſhment, the moſt violent lightnings and thunder burſt from it, and hail began to fall. This encreas'd in a moſt dreadful manner, and with a ſtrong and ſuffocating ſmell, like burning brimſtone. The hail ſtones this creditable author atteſts, were more like pebbles: their colour blueiſh, and their hardneſs like flint, till they ſoftened in the wet. He gives an account of their ſize, which exceeds all others, and which, if leſs authenticated, could not be believed: he ſays ſome of them weighed a hundred pounds. We are not to wonder at the damage done by ſuch a ſtorm. It killed almoſt all the cattle, fowls and fiſh in the county; and vaſt numbers of the people [†].

In calamities like theſe there can be no remedy, and there is no courſe to follow but religious ſubmiſſion.

We have ſhewn the huſbandman what is in his power to do againſt others; and in general, where he has a tender crop, that ſtands much expoſed, we ſhall adviſe him to uſe the eaſy method of ſticking up a few furze buſhes. This will not only be a defence againſt hail, but it will break the force of winds, and keep off thoſe cold rains, they often carry before them. It is a practice ſo cheap, ſo eaſy, and ſo certain of doing ſome good, that we greatly recommend it.

CHAP. XIII.

Of ſnow.

SNOW often is of great advantage to the farmer. A deep ſnow keeps all ſheltered underneath it; and frequently defends a tender crop from thoſe ſucceeding froſts which otherwiſe would have deſtroyed them. We have recommended to the farmer, on ſome occaſions, the covering his tender growths in winter by the dry ſtalks of peaſe, or the like: ſnow often falls ſo favourably as to perform this ſervice better for him than he could have done it for himſelf; more generally and more univerſally. It lies thick upon the young plants, covering them perfectly, and defending them from the nipping and deſtructive winds: it all that time mellows the ſoil; and when warmer weather comes to melt it in, nothing ſinks down ſo gently or ſo gradually.

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[*] Numb. 203.

[†] Mezeray's Hiſt. de France, vol. II. p. 339.

Snow is like ice, a watery ſubſtance congealed by freezing. When the air is warmer, it melts and falls in ſmall rain. The moſt perfect appearance of ſnow is in form of a ſtar of ſix rays, and its ſubſtance clear tranſparent ice: but this is not its conſtant or certain figure, the flakes are frequently imperfect.

There is an account of a red or bloody ſnow by an Italian, ſignior Saratti, preſerved in authentick writings: it is ſaid to have fallen near Genoa: but this is very difficult to be reconciled to what we know of the courſe of nature. Snow is no other than water frozen; and this water is raiſed in vapour by the ſun. We are ſenſible that vapours do not riſe coloured. The ſtrongeſt tincture of cochineal will yield a colourleſs water, if diſtilled; and red port wine affords a colourleſs ſpirit. From theſe, and many other conſiderations, there is reaſon to imagine there has been ſome miſtake in what is written on theſe ſubjects.

The ſnow is often advantageous, preſerving a crop; yet like all other good gifts of nature, it may be hurtful in the extremes. Snow, which ſhelters his crop may, in a great fall, ſmother his cattle. He muſt watch it as it comes, and obſerve whether it will be in the common courſe, or exceſſive and violent. When he ſees a vaſt quantity on the ground, and more in the air, let him drive in his cattle, and preſerve them from the danger of being overwhelmed and buried in it, as they ſometimes are in thoſe hollows to which they fly for ſhelter.

CHAP. XIV.

Of winds.

WINDS are too frequently hurtful. Their great purpoſe is to thin and purify the air; and they will often be dangerous to the huſbandman's crops, and even to his buildings; he muſt timely guard againſt them.

The ſea would putrify notwithſtanding all its ſalt, if winds did not ſtir and move it about: freſh waters, when large, would ſooner ſuffer the ſame fate, and men would be carried off by peſtilences raiſed from the vapours of ſuch corrupted maſſes; all this is prevented by the timely miniſtry of the winds; and all their force may be broken with reſpect to the farmer, by a proper plantation of trees. We know from what quarters the moſt furious winds blow, and the defence is to be prepared thickeſt there.

There may be alſo particular cautions uſed, to prevent damage on extraordinary occaſions; and as ſtorms may generally be foreſeen, theſe ſhould be prepared according to the neceſſity. Wind is no other than air in motion. We are ſenſible there is ſuch a thing as air, by the changes we perceive in it, but as it is too fine a ſubſtance to be the object of our ſight; we only perceive it in the winds, feeling it by its motion; when ſtill it is not perceptible to any of our ſenſes, though manifeſt to our reaſon.

We in this iſland are ſubject to great variations and changes of wind, but this is not the caſe throughout the whole world. Between the tropicks there is a conſtant and unchangeable wind, that all the year blows from eaſt to weſt. About the coaſts of the ocean there are conſtant and regular winds alſo, at certain times of the day called ſea breezes. They blow every evening from the ſea to the land; and every morning from land to ſea. In many parts of the world there are regular periodical winds. Theſe blow one half of the year one way, and the other half the other. In our iſland the winds play about with great uncertainty; but in general north winds are moſt frequent in a morning, weſt at noon, and ſouth at night. Winds blowing from off the ſea are naturally moiſt: theſe, when they are gentle, bring only a pure watery vapour; but when the ſurface of the ocean is ruffled by them in ſtorms, they carry off a part of the abſolute ſalt water; this is called the ſpray of the ſea.

This is mentioned as a practical caution for the farmer. Many of his crops will be injured: it is his buſineſs to keep a good hedge every way to the ſeaward. North winds in England are cold, and the ſoutherly winds warm. A fall of ſnow will change the courſe of our winds. A warm ſoutherly wind ſhall often be changed into a cold northerly one by this or by a ſhower of hail.

The ſtrongeſt and coldeſt winds coming from the north and north eaſt quarters, it is againſt theſe the greateſt caution is to be had in planting. The ſycamore has been happily experienced in the neighbourhood of the ſea, where it thrives very well; and on the moſt expoſed ſituations the yew is excellent. It will bear the expoſure, and delights in the hard dry ſoil uſually found in thoſe places. After the yew we may name the elm, it roots firm, and is full of branches. Its growth is not ſlow, and there are few ſoils on which it will not thrive.

In trees planted for ſhelter to a houſe, there ſhould be a particular method of cutting. The elm will grow to any form, and ſo will moſt other kinds. When the building is much expoſed to winds, ſo muſt the trees be that are ſet to ſhelter it: therefore let them be ſo cut as to be leaſt liable to danger. The head is the part over which the wind has moſt power, and it is of leaſt ſervice in ſheltering the dwelling: therefore in theſe caſes let the head be ſmall, and the tree encouraged to ſhoot out into branches. The thicker they ſtand the more is the ſhelter, and the leſs they are in danger of being torn down.

CHAP. XV.

Of the ſigns by which winds may be foreknown.

THERE are fewer notices of wind, than of rain or drought: but the huſbandman ſhould be the more careful in looking after them.

If there be a red duſky ſky in the morning, and the ſun riſes white and deadiſh, he may expect violent guſts of wind; and generally ſome rain. When the ſun is pale at ſetting, and goes down behind a thick dead-looking cloud, there commonly follows rain that night; and uſually a ſtrong and diſorderly wind the next day. If the moon look dim and miſty, and have a large hazy circle about her, the next day will be generally ruffled by winds. When the moon looks particularly bright, but has about her two or three broken circles, it is a ſign of a ſtorm. When the ſtars appear more numerous than uſual, and have a lively luſtre, it foretells a ſtorm. When there are a number of ſmall black clouds ſcattered in the heavens, and they move to and fro in a diſorderly manner, ſtrong and unſettled guſts of wind may be expected: theſe are the winds that do moſt harm to the products of huſbandry, therefore the greateſt regard ſhould be had to this ſignal.

When a rainbow is thicker than ordinary, it is a ſign of guſts and blaſts. When there is a great deal of red, and that is fiery, it betokens ſtorms. The rainbow is ſometimes interrupted in its courſe, and as it were ſeparated into many parts: this is always a ſignal of winds.

About the ſea coaſts a great deal may be gathered by birds. The more ſerene the air, the farther they keep out at ſea. When they ſuddenly make to the ſhore, there is a haſty ſtorm approaching: and when they keep about the ſhore, and will not venture into open ſea, there will be ſtrong winds that day.

There is in ſome places a ſmall bird, which they call the *ſtorm bird:* this has ſuch knowledge, and ſuch dread of a ſtorm, that it makes immediately to the ſhore when it is near, on the approach of danger; but at open ſea it follows ſhips, giving token to the ſailors.

CHAP. XVI.

Of the damages done by winds to huſbandmen in their crops.

PLANTS receive injury from winds at different periods of their growth: while young, the blaſt will often chill or ſhrivel them up: when more advanced, they are open to its force by their larger bulk: at this time they require to be very well faſtened in the earth by their roots; and the moſt natural effect from the wind is the rocking them about, and looſening of them. This is little regarded by huſbandmen, tho' very much by gardeners. In new planted trees the cuſtom is to tie them up to ſtakes: and the ſtalks of flowering plants that riſe to any conſiderable height, are in the ſame manner faſtened to ſticks. This is of the greateſt ſervice: preſerving the roots quiet and ſteady in the earth.

The farmer's care in moſt reſpects, muſt be employed in getting ſtrong and thick fences: and in particular crops there muſt be particular cautions, which we ſhall name. Of all his products, there is none which ſo often receives damage by wind as hops. The blaſts of the ſpring nip their buds, and the ſtorms of ſummer ſhake them at the root.

With reſpect to the nipping winds of ſpring, as the plants are not much advanced, they are eaſily ſheltered by a high pale, or cloſe hedge. With regard to rocking them at the root, the firſt defence is to chuſe a ſheltered place for the ground; or plant tall trees that may ſhelter it: and for all ſucceeding time the grand ſecurity is the fixing the poles deeply and firmly in the ground.

Corn is expoſed to winds, not only when in the ear by lodging, which happens from winds and rain together, but while in the firſt ſhoot; ſharp winds ſometimes deſtroy the produce at this period. It is in open fields the crop is moſt liable to this miſchief; and the ſame remedy will preſerve it in both ſtates: this is a good encloſure. Different ſoils require different ſhrubs for hedges; and we have given the farmer his choice of a vaſt variety of kinds for this purpoſe.

When a plantation of one kind does not ſucceed, he ſhould try another; and when he is doubtful of the kind that may be beſt, it will be right to plant two. Moſt hedge ſhrubs will grow as well two together as ſingly. When there is danger, from the dryneſs and barrenneſs of the ground, it is a good caution to ſow furze on the ſide of the bank. If the hedge ſucceed well, this may be pulled up; but it rarely does ſo well but that a bottom of this buſhy plant may be an advantage. The winds that nip winter corn in the blade, get in more at the hedge bottoms than elſewhere; and nothing is a better fence againſt them.

CHAP. XVII.

Of the nature of blights.

WE ſpeak of the blight familiarly, becauſe it is common: but among many things conjectured as to its origin, very little ſaid has any foundation in fact.

The blight is a diſorder that affects trees and plants. It appears in various forms according to the degree, affecting ſometimes entire plants, and ſometimes only parts of them. It is the ſame diſorder which the vulgar call a blaſt. When it ſtrikes a tender plant, it often periſhes; and in ſome caſes, the whole product of a field is loſt at once. At other times it ſtrikes only a part. The leaves often fall off, while the reſt is unhurt. Sometimes all the leaves are attacked, and ſometimes only a part of them. The leaves that are tainted, ſhrivel up and appear ſcorched; and the part of the tree which is thus ſtruck is covered with little inſects.

This diſorder is common to all parts of the world: we read of blights wherever we read of huſbandry; and for more than two thouſand years men of ingenuity have been gueſſing variouſly at the cauſe. The Greeks looked on it as a ſtroke from heaven; utterly incurable and incapable of prevention. The Romans called it Robigo; and as they deify'd plagues and fevers, worſhipping every thing they feared, their fanciful imaginations form'd a deity upon this occaſion; they called the new-made god Robigus; and Varro ſolemnly invokes his bleſſing, that blights be kept from trees and corn.

In general it was attributed to the eaſt winds; but Virgil, with more reaſon, lays the cauſe of it to want of care; and, inſtead of praying to an imaginary god, adviſes the farmer to betake himſelf to labour.

The early notion of attributing blights to eaſt winds, has been continued to this time; and the curious ſeeing inſects in abundance on the leaves and branches, ſuppoſe theſe eaſt winds brought their eggs, and that they are the cauſe of the diſtemper.

Others attribute the cauſe to drizling ſhowers freezing upon the tender buds: in both conjectures there is ſome foundation; but they err contemptibly who attribute this diſaſter to the aſpect of the planets. The accounts from thoſe who maintain the other opinions are of little conſequence, for they agree with only one part of the ſubject. They attempt to explain only the blights of the ſpring. But there are blights at other ſeaſons of the year. Corn is often blighted in its full growth, in a wet ſummer. This accident may happen without froſts, or without thoſe ſharp and cold winds, which though they frequently attend it, they are not the occaſion of the accident. Thoſe blights which are called fire blaſts, in a hop ground, happen in July oftener than at any other time.

CHAP. XVIII.

Of the antient and modern obſervations of blights.

THE cauſe is not what theſe perſons have thought; the farmer muſt ſeek farther for a remedy. The ſame accident that happens in our hop plantations, us'd to damage the vineyards of old Italy. The authors on country affairs, diſtinguiſh it by the name of Carbunculus; this we find was the ſame with the Robigo or blight. The time of this damage appears to have been the ſame with that in our hop grounds, and the circumſtances alſo the ſame. Ours happens at the end of July, and theirs come on toward the ripening of the grapes. That it generally followed violent and ſhort ſhowers, which happened about noon, and were followed by clear ſunſhine. It was ſometimes partial, ſometimes univerſal: when it was partial, 'twas the middle of the vineyards that ſuffered, and when it extended through the whole ground, it was plainly perceived to have begun in the inner parts, and there to have been moſt ſevere.

If we compare with this the exact obſervations of Dr Hales, upon our ſummer blights in hop grounds, we ſhall ſee the antient * and the modern † very happily explain and illuſtrate one another: and the farmer will thus, better than any other way, be led toward the diſcovery of the real cauſe of the diſaſter.

No plantation can ſo much reſemble the antient vineyard, as our Kentiſh hop grounds: the ſeaſon for their carbunculus is the ſame with that of our fire blaſts, and the circumſtances attending both correſpond. The obſervations of our Engliſh philoſopher are, that when there has been rain, and a hot gleam of ſunſhine immediately followed it, the fire blaſt has happened: that it has attack'd the plants in the middle of the hop ground particularly, ſcorching them all up in a manner from one end to the other.

The damage in a particular inſtance happened a little before noon; and the blight or fire blaſt ran in a line at right angles with the ſun beams at that time of the day. There was little wind; and that was in the courſe of the blights. Thoſe who would enquire into the nature of theſe diſorders in plants, are extreamly obliged to the author of theſe punctual obſervations: for comparing them with what we find in the antients, we ſee that the nature of blights is a fixed and certain thing; that they appear in the ſame manner, and obſerve the ſame courſe, and that they plainly ariſe from the ſame cauſe in the moſt remote parts of the world. This ſhews their origin to be always from the ſame principle: it is not impoſſible upon ſo much obſervation, to make a probable conjecture what it is, and thence to attempt a regular method of preventing its damage, or defending plants and trees from it.

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* Columella de Re Ruſt.

† Hale's vegetable Staticks.

CHAP. XIX.

Of the real cauſe and origin of blights.

A Blight, properly ſo called, is a damage ſuddenly happening to trees and plants, which appears in the manner of burning, ſcorching, or ſhrivelling up the leaves, and often withering the young branches. This happens ſometimes in ſpring, ſometimes in ſummer; and is what is properly called by the preſent name: if any ſay a growth of whatever kind is blighted, becauſe it is ſtarved, or diſtinguiſh by that name the damage done by froſts upon early bloſſoms, they are to be told theſe diſorders of plants and trees come under the heads of accidents from froſt, and accidents from want of nouriſhment, and will be treated of diſtinctly as ſuch. What is here mentioned under the article blight is a diſtinct thing, and it is of its cauſe alone we treat in this chapter.

This blight ſometimes affects a whole plantation, or at leaſt the whole internal part of it, and ſometimes only here and there a plant. In the firſt caſe, it depends in ſome meaſure on the nature of the plantation, and therefore may be prevented; in the other it ariſes from cauſes quite out of our power. But it is of the leſs importance, becauſe it affects but a ſmall part of the crop.

The blight affecting the inner parts of hop plantations, and which the antients mention as deſtroying their vines, will alſo deſtroy whole crops of various kinds in the field: we ſhall ſee the cauſe of this, and therefore may reaſonably propoſe a remedy. As it affects the inner parts of plantations firſt and moſt, and as it follows rain, there is reaſon to believe it is the effect of a vapour raiſed in thoſe places, and ſtagnating there; on which the ſunſhine operates to the deſtruction of the plants. If this ſhall appear to be the true cauſe of blights, the remedy will follow plainly. It conſiſts in keeping the plantations clearer: ſetting the ſeveral plants at greater diſtances, and giving the air free way between them.

If the outſides of the hop plantation eſcape, while the inner parts are deſtroyed, what is the cauſe, but that the free air coming to the outſides diſpels and ſcatters that vapour, which ſtagnates in the cloſe parts of the ground, till the ſun, by its means deſtroys the plants. This plainly is the cauſe, and there is no other, nor can reaſon propoſe, or will experience vouch for any other courſe. Therefore the remedy will be to make the plantations more open and free to the purifying air. Hop grounds muſt be ſheltered from high winds, or all will be deſtroyed; but they may be left open on the milder quarters: though they are to be defended, they are not to be ſmothered up. This is the effect of over caution in weak minds, but nothing is more dangerous.

When the ground is ſo diſpoſed that the air can have free ingreſs to all parts of it, there will be nothing to fear from fire blaſts. What is obſerved of the hop ground, holds good of all other plantations: I only name that becauſe this is the moſt particular, and that in which it is moſt plainly ſhewn. The way to give the air this free paſſage, is to place the hills at greater diſtances than uſual. We have laid down the beſt diſtance in general; but where the whole ground is more encloſed, the paſſages within muſt be opener.

Too cloſe planting is deſtructive to hops, by bringing in theſe blights, and fire blaſts, becauſe the hop is ſo tall and large a plant: in all others it more or leſs affects them, according to their height and manner of growth, and according to the expoſure of their ſituation. The ſummer blights of corn, and other crops, are owing to this cauſe, the plants ſtanding too cloſe; in this caſe the hot ſunſhine following large ſhowers, blights whole fields. The caution to be given the farmer is, that he plant all his crops thinner than the uſual cuſtom: this we have recommended to him already, and have ſhewn him that his produce will not be leſs, but greater for it. Particularly where the place is moſt cloſe, the diſtance of the plants muſt be the greateſt.

This caution recommends the horſehoeing huſbandry as a cure for blights, and indeed there is none ſo certain. Whoever ſaw a field of any crop treated in this manner, blighted: 'tis not only the clearing the ground between the plants, that gives them this advantage in the horſehoeing huſbandry, but the affording them more nouriſhment, helps greatly. Starving and blighting are diſtinct things; but a ſtarved plant will be ſooner blighted than one that is ſtrong and flouriſhing.

If we would be aſſured of the truth of what is here advanced, reſpecting the cauſe of blights, our eyes may be made evidences. Let any man look into a hop ground on a ſunſhining day, after great ſhowers. In the middle of the ground, and wherever the plants ſtand cloſe, he will perceive vapours riſing in abundance, and hanging with a quivering motion among them like a light ſmoak, where there is no wind. Let him examine whether there be theſe vapours about the outſides of the ground, and he will find there are not. All is there clear, becauſe the acceſs of the air is free, and they blend among it as they riſe. Blights and fire blaſts follow in the middle and cloſe parts of the ground, and not on the edges: they come where theſe vapours have been ſeen hanging; and no where elſe. Therefore we muſt conclude theſe vapours are the cauſe.

The remedy is eaſy. Let the air have free egreſs as well as ingreſs among all parts of the crop, and no blights will be found. This is beſt obtained by the horſehoeing huſbandry, but any method of keeping the plants at a diſtance, will anſwer the purpoſe.

In thoſe particular blights which fall upon only a ſingle plant, the origin is alſo an undiſſipated vapour. If it be aſked, whether little parcels of ſuch vapours ever hang about in the air, thoſe who uſe teleſcopes can tell us they do. 'Tis not eaſy to diſtinguiſh them by the naked eyes, but when thoſe curious perſons uſe theſe glaſſes, they often diſturb the ſight. One thing that confirms the opinion of theſe partial blights happening from ſuch little parcels of vapours is, that they generally come when there is no wind. Wind would break and diſperſe them.

CHAP. XX.

Of damages by eaſterly winds.

THERE are ſpring blights of the ſame nature with thoſe of ſummer, the effect of ſcorching vapours ſtagnating in the air, and heated by the ſun. But beſide theſe there are two kinds of damage done by eaſterly winds, and by late froſts, which, though called by this name, are diſtinct in nature: eaſterly winds in ſpring knip and deſtroy the tender ſhoots of plants, by ſtopping the current of the juices. When the juices are ſtop'd they ſwell the young fibres, and the leaves burſt and wither. The juices guſh out, and become the food of numerous little inſects. Wherever there is food for theſe creatures, nature ſends them in great number; and in this caſe there are preſently ſeen abundance of them on the decaying ſhoots.

Inſects are always found upon theſe damaged branches, and by a natural error they are ſuppoſed to occaſion the miſchief. The farmer imagines the eaſt wind brought their eggs, and he ſtrews tobacco duſt over the crop, or burns wet ſtraw. He aims to deſtroy the inſects, as if that would recover his crop: but he errs: the firſt ſtep would have been to guard againſt the miſchief, and when that has been omitted every following care is in vain. The eaſt wind does not bring theſe inſects, nor are they the occaſion of the miſchief: they hatch where there is food, and they feed upon the juices which theſe blaſting winds have ſtopped in their current. Theſe harmleſs creatures do not eat the leaves, or tear them; they find them burſt, and feed upon what runs from their wounds.

The farmer may know when there is danger from theſe winds, their effect is by abſolute drying up the parts, and the deſtruction is ſolely brought on that way. When there are moderate ſhowers, or good morning dews, theſe eaſtern blaſts do no harm. Therefore the farmer knows when he is to fear them. When he ſees a dry ſpring, and the wind ſet in eaſterly, let him go over his fields and his orchard, and ſee what part of his crops are forwardeſt, for they will be in moſt danger. Let him not ſtay for the appearance of inſects, but prevent if poſſible the effect of the blaſts: this is to be done by defence and ſhelter. The uſe of thick furze buſhes may ſerve for this purpoſe; and they ſhould be ſtuck in the ground in cloſe rows, not only on the ſide where this deſtructive wind is likely to come in, but in different places, at ſome diſtance in the ſame direction.

The cauſe is ſo different from that of a common blight, that the remedy is to be juſt of the oppoſite kind: in that caſe the wind is to be admitted among the plants, becauſe it will carry off the vapours which are the occaſion of the miſchief: in this it is to be kept off, becauſe it is itſelf the cauſe of the injury.

When he has ſheltered a crop in danger on this occaſion, if in any place he ſees his plants hurt, let him thicken the ſhelter there: and having provided againſt the extending of the damage from the original cauſe, let him take care that it be not encreaſed by its natural conſequences.

Inſects which appear on plants nipped very much contribute to the ſpreading of the diſorder. They breed faſt; and that in a very particular manner. They do not wait the ordinary method of copulation of both ſexes, but they are all breeders: and the young produced from them are full of others, which they diſcharge from time to time, and ſo on at leaſt for ſeveral generations. This may appear ſtrange to many, and it is one of thoſe wonderful proceſſes of nature, in which for particular purpoſes ſhe departed from her uſual tract and courſe. Mr. de Reaumur, of the royal academy of ſciences at Paris, the Ray or Sloane of France, had the curioſity firſt to diſcover and trace this wonderful procedure, and many have ſince obſerved it: any one may, for the creatures are common enough; and if one of them be put into a little box and kept alive, it will produce its young; and any one of theſe young taken out as ſoon as born, and kept in a ſeparate box, will do the ſame; and its young after it. The experiment has been continued through five generations. An accidental injury brings them to the plant, but they are capable of doing a great deal themſelves. Having fed upon the juices that iſſue out of the burſt veſſels, they will pierce them in other parts in ſearch of more: and thus the plant will be full of wounds. Out of all theſe juices will flow, and they will thicken and grow clammy in the air: and this being the proper food of theſe creatures; not only their own numerous brood will from time to time encreaſe the miſchief, but this quantity of new food will occaſion the repeated hatching of more and more of the ſame kind, brought in the egg or embrio as the firſt were, in the air.

Let the huſbandman prevent the ſpreading of the miſchief by deſtroying the inſects, and ſpoiling their natural food. Winds occaſion this miſchief, and dry weather ſupports the inſects: of all the methods deviſed for their deſtruction, none is ſo effectual as drowning them. The plants ſhould be well watered every day, and this repeated conſtantly till natural rains fall. Rains deſtroy theſe creatures, and reſtore ſuch parts of the plants as are not utterly ſpoil'd to their former vigour.

Nothing can be ſo proper, as to imitate this by art. Watering the plants will not only deſtroy many of the inſects, but will waſh off the ſweet juices that hung on the leaves, and would have brought more: and at the ſame time will be remedying the dryneſs of the ſeaſon.

Plants ſuffer in their ſhoots by theſe winds, becauſe there is no moiſture to prevent their ſhriveling up: and by this means that moiſture, ſo needful to the ground, is given by the hand of the huſbandman. Watering them all over anſwers this purpoſe extremely for the time when it is doing; but the good effect is not limited to ſo ſhort a continuance. The vapours riſing from the wet ground ſoften the air, and the young ſhoots and leaves are kept in ſuch a condition of moiſture, as to reſiſt the effect of parching winds all the ſucceeding day. Watering in an evening when the nights may be froſty, may be the entire deſtruction of his crop. He muſt for this reaſon water and waſh his plants only in a morning.

CHAP.

CHAP. XXI.

Of damages by late froſts.

THUS one of the accidents which happen in early ſpring to the crops of the field, and which is improperly called a blight, may be remedied by due care: we now treat of another damage of the ſame ſeaſon, called by the ſame name, but altogether different in nature. The unexperienced eye is pleaſed to ſee the early appearances of ſpring in the field; but the more judicious tremble. In our uncertain climate, nothing is more ſubject to deſtruction than an early ſhoot: we have froſts late in the ſpring, and theſe nip and deſtroy ſuch early ſhoots. It is our happineſs, when the ſeaſons are more regularly ſeparated from one another; when the winter takes its time, and the ſpring begins late enough to continue uninterrupted. When a crop of tenderer kinds has ſhot briſkly from ſome early ſoft weather, the ſevere mornings that follow nip the tender leaves and they fall off, and not unfrequently the young ſhoots with them: this is a ſtoppage in the growth that is difficultly recovered.

Gardeners, whoſe bloſſoms and young fruit are injured by this accident, have recourſe to a method of prevention which encreaſes the diſeaſe. They cover up the trees with mats, and thus defend them from the preſent froſts; but they make the ſhoots by this means ſo weak, that they are ſure to be deſtroyed by the next. If the farmer could any way imitate this practice, it would be by ſcattering ſtraw or haulm over a tender crop: but without the utmoſt care, more damage would be done by this than good. If he ever ſhould be tempted to follow this practice, he muſt have this covering ſcattered ſlightly on every night, and removed every morning. If it were ſuffered to lie on all day, the plants would be drawn up ſo weak, that they would be ſure to be deſtroyed by the next froſts.

Let the farmer before he commits his crop to the ground, conſider the dangers to which it will be expoſed. Some of his crops are required early, and to others it is of little advantage. The earlier he ſows, the earlier his crop will riſe, and the ſooner in ſpring it is up, the more it will be expoſed to danger. Let him run the hazard, for none but ſuch as will, have a proportioned benefit from their forwardneſs: and with reſpect even of theſe, let him be moderate.

CHAP.

CHAP. XXII.

Of damages from weakneſs and ſtarving.

AMONG the many diſorders of plants, comprehended under the article blights, in the common way of ſpeaking, one is that of weakneſs in the growth from ſome accident, which ſtarved them.

The effect we ſee produced by a real blight, we ſometimes alſo find attending this; and the account for it is very eaſy. In that caſe a thick vapour, by means of a ſtrong ſun, has ſhrivelled the leaves, and ſcorched the ſtalks: and in this a like accident happens from the want of nouriſhment. Thoſe parts neareſt the root are beſt ſupplied, and therefore are flouriſhing, while ſuch as are fartheſt from that ſource of nouriſhment, wither, when there is not enough to feed all.

'Tis the ſame as in the human body: when the heart cannot drive the blood through all parts; thoſe fartheſt from it ſuffer firſt, the hands and feet have the juices firſt ſtagnate in them; and in the ſame courſe in the plant the tips of the branches, and thoſe other parts moſt remote from the root are firſt affected.

We name this for the farmer's ſtrict obſervation; if he perceives all the tips of the ſtalks and branches affected; and few other parts, he may be ſure the diſorder is no blight or blaſt, but a ſtagnation of the juices in the extremities, for want of a freſh ſupply to force them on in their natural courſe. Although there is not a circulation of juices in plants, there is a continual motion forward. This is neceſſary to the healthful ſtate of the plant; and wherever it ceaſes the part becomes diſeaſed.

It is not ſtrange this ſtagnation happens from ſtarving. When the whole is in a flouriſhing ſtate, the root takes in a great deal of moiſture, which it ſends upward in a conſtant motion, and this drives on the reſt. When there is not enough received, and the plant is not vigorous enough to throw it up, this motion grows faint. The juices ſtagnate in the extream branches: and burſt the veſſels, and ſweat out. This calls the inſect tribe together. Their eggs or embrios are floating in the air; and wherever there is food they ſtick and hatch: and they breed abundantly. Theſe come where there are corrupted juices; and their appearance is as natural from ſtarving as from ſcorching of the plants.

When the cauſe is a defect of nouriſhment, and not a ſcorching vapour, the remedy is natural, but it is not eaſy to be applied in all caſes. The farmer will here ſee again the excellence of the horſehoeing huſbandry. This blight may always be remedied in that method, becauſe it is in our power at any time to give the plants a ſupply.

It will rarely happen that a crop raiſed in the new huſbandry is ſubject to this diſorder, but when it is, the remedy is to ſend in the hoe plow, and tear up the ground to a good depth between the rows. This, giving the plants abundant new nouriſhment, the diſeaſe is remedied at once. The whole crop ſhoots ſtrongly; and the little inſects, whoſe food depends upon the ſtarved condition of the plant, drop off.

When large growing plants are thus endangered in the common courſe of huſbandry; the hand hoe muſt be immediately employed. There is in this caſe no clear interval for cutting deep into the ground, but what ſpace there is between plant and plant, muſt be broke as well as it can at the edges and ſurface.

All the weeds will be cut up by the hoe. But let the farmer not ſtop here, probably the plants ſtanding too cloſe has occaſioned the miſchief. Or if not, no way is ſo ſure to recover one half as to cut up the other. This will give the hoers leave to work more boldly, the earth will be more broken, and the air, dews, and rains better let in: the wind will be able to blow freſh between the plants alſo, and every thing will thus tend to their recovery.

Let not the huſbandman grudge the part of his crop that is to be deſtroyed. The queſtion is whether he ſhall have half or nothing. In the common plantations of the orchard, if the trees fade he muſt dig round with a ſpade, breaking the earth well, and throwing it in carefully and lightly: but in our method of planting diſtant for cultivating the land between, let him bring in the plough, bear very near the roots of every tree that is in this ſickly way, preſs the plough deep, and make the ſhare, as Virgil ſays, ſhine from the furrow. This will give new nouriſhment and new life to the plantation; and thus in every other article, where the miſchief plainly happens from a ſtarved condition, let him give the crop a more abundant nouriſhment, and make it ſhoot ſtrongly. This done, he need not trouble himſelf about the inſects; for when the cauſe is taken away, the effect ceaſes.

CHAP. XXIII.

Of the nature of mildew.

SOME have aſſerted, that blights and mildew are the ſame; but they neither are altogether the ſame in their nature or conſequences; neither are the ſame remedies or precautions proper; therefore this is a very hurtful error.

Others in the vehemence of expoſing their error fall into another of as bad conſequence. They ſay they are not at all alike in cauſe, or in their nature. This is palpably a miſtake; for they are alike in ſome reſpects, though they are not the ſame.

We ſhall endeavour to ſet the huſbandman right in this important article; and in order to it ſhall refer him to what he ſees in nature. The firſt ſtep toward his arriving at the truth, muſt be his underſtanding the errors which have been delivered to him as the real accounts of the accident. Nothing can ſet the common claſs of writers in a meaner light, than the obſerving in the preſent inſtance how they have tranſcribed miſtakes, and copied unmeaning words from one another.

Old Markham fetches mildews from the heavens. He attributes them to baleful influences, and malignant vapours of the ſky; which ſtriking to the earth alter its ſweet and pleaſant nouriſhment, and change it into bitterneſs and rottenneſs; whereby the corn is ſlain outright, or rendered withered, lean, and all unkindly *. This doctrine paſſed for current, till the ſucceeding days of Worlidge, who ſearching nearer home for the diſorders of his crops, attributes this to a fat and moiſt exhalation from the flowers, and other parts of the vegetables, condenſed by cold in the upper region of the air, and thence falling upon plants again †.

The language of Markham is florid in his uncouth way: that of Worlidge is familiar enough. In general, the farther people in theſe ſtudies deviate from plain language, the farther they depart from utility: theſe are writings meant to inform the mind, not to pleaſe the imagination. The fields may laugh and ſing in prophecy, and Virgil may have beauty in his *intereunt ſegetes* ‖, for his georgicks are poetry: but theſe are not the expreſſions which ſhould be uſed in laying down practical rules to the induſtrious huſbandman, and explaining their uſes.

Worlidge has delivered his plain, original conjecture, and many have adopted it; for Markham's was the error of his particular age, and could not be well received in any other.

Induſtrious Mortimer has copied honeſt Worlidge, not his thoughts only, but his § words; not ſo much as attempting to reaſon, or improve upon him. Worlidge, though not exactly right himſelf, yet laid a foundation on which a little plain ſenſe and good obſervation would have arrived at the whole truth.

From Mortimer, Chomel tranſlating this imperfect account, ‡ conferred a laſting obligation (ſuch were the words) upon

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* Book 2. p. 81. † Syſt. Agriculturæ, p. 209. ‖ Book 1.

§ Art of Huſbandry, b. 7. p. 303. ‡ Dict. Oeconomic.

his country; and from Chomel 'twas engliſhed back again, under the auſpices of Bradley *.

Thus we ſee how many write, and how few think: how error goes the round of different nations: that which was old in Britain, after it had appeared new in France, grew new again at home, in the tranſlation of that firſt tranſlation. From theſe, unaltered, unimproved, and unamended, the account made its way into the compilations of Chambers † and of Miller ‖; and from thence into the patched productions of ſtill later writers below contempt. This is what the farmer meets if he have curioſity to read for information. The firſt rational advance he is to make toward truth, is, by ſeeing the errors and the imperfections of theſe accounts; and the next is, to read it in the book of nature.

CHAP. XXIV.

Of the real cauſe of mildew.

THE firſt accounts of mildew were erroneous, and the later imperfect. It is not true that mildews are ſent down from the clouds; nor can they ever be underſtood by thoſe who join the exhalations of the earth and thoſe of plants together. Let the farmer look out into his fields, and when he ſees a ſettled mildew on his crop, he will find inſects, as in blights, feeding upon a honey-like moiſture lodged on the plants: where it is but beginning, he will find this moiſture tho' leſs thick, yet ſweet and clammy, covering the young ſhoots, though the inſects have not found it. This ſhews him, that the cauſe of mildew is the hanging of a thick ſweet moiſture on the plants; here is his firſt ſtep to the true knowledge of the diſorder; the next is to enquire whence this liquor comes: not from the clouds or ſkies, according to Markham; for only pure and ſimple water can get thither, nor did any thing elſe ever deſcend from thence: neither can ſuch a juice riſe from the earth, as Worlidge fancies, for there is none ſuch there. Waters may be impregnated with minerals, and their virtues may riſe with them; but there can be nothing of the honey-kind raiſed from thence. The earth can ſend up nothing but what it has, and it has not in it the ſweet juice which occaſions this accident.

Let the huſbandman inform himſelf what this ſweet liquor is; it is but one thing in whatſoever form it appears. Whether it be ſolid or liquid it is the ſame ſubſtance; and it is the ſame whether we ſee it in the form of honey from the bees ſtores, of manna from the aſh trees, or of ſugar from the reed.

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* The ſame work tranſlated into Engliſh, article mildew.

† Encyclopœdia.

‖ Gardener's Dict. article mildew.

We ſee there is ſuch a ſubſtance in nature, and but one ſuch; and, to underſtand this diſorder which it cauſes, let us enquire whence it comes. It is not dropped down from the heavens, nor drawn up by the ſun from the ground; this we have ſhewn: there remains but one way it ſhould come, and therefore that muſt be the true ſource of it. Since it is not originally in the earth or air, it muſt be produced in the bodies of plants; and that is its true origin.

The juices of the earth are received into roots; and theſe are only water and the fine part of mould, and of manure. They have nothing of this ſweet taſte, nor of the honey or ſugar nature. They are received into the veſſels of the plant, and there, by an operation to be admired, not to be underſtood, they are converted partly into the ſolid parts of the herb, and partly into theſe ſweet juices. We know this is done, but we cannot enter into the ſecrets of nature ſo far as to find how. Let the farmer, more humble than the philoſopher, be ſenſible of this, and know where to ſtop his enquiries. It is enough for all uſeful purpoſes, that he knows this juice is there. This is extracted by the bees from their flowers, in its proper form, and lodged in their combs as honey. From the ſugar-cane, the juice being boiled down, leaves it in form of ſugar; nor is that peculiar to this plant: the juice of the maple is, in ſome parts, boiled to ſugar, in the ſame manner; and that of the birch, or any other tree, or plant, properly managed, may.

This juice, which is ſeparated in the flowers, or lodged in the ſap, may ſhew itſelf on the outſides of the leaves and branches. It does this on the oak in our country, and is there called honey-dew; and in Italy on the leaves and branches of the aſh, and is called manna. This is the circumſtance that comes neareſt to our preſent purpoſe. In the courſe of nature this ſweet liquor ſhould be kept among the ſap, except the little that is ſeparated in the glands of flowers; but in theſe inſtances it will ſhew itſelf in a ſeparate form on the leaves. It is not the oak alone in our kingdom that has this honey-dew upon its leaves; nor is the aſh the only kind that has it, in hotter countries, in the ſhape of manna. The manna of Briancon in France, is gathered from the larch-tree, and that of Perſia from the Alhagi, yet theſe are both true and genuine manna.

This juice, which is thus contained in all plants, may by accident be brought out to the ſurface, and being there diſlodged, it will ſhew itſelf firſt in a clammy moiſture; and afterwards, according to the various circumſtances, in a tough matter like honey, or in a dry and firm ſubſtance, as manna. Experiments have proved that the French manna did not come from the clouds, but was the real ſweet juice of the plant. Boughs have been cut off clean in the manna-ſeaſon, and the manna has been found upon them ſome time after, though they had lain within doors.

This, and other obſervations, ſhew the ſweet thick ſubſtance found on plants, is not raiſed from the earth, or dropped from the ſky, but is ſweated out by the plant itſelf. Trees can bear this better than tender herbs, and to this is owing the difference of its effects, in not hurting the one kind, and injuring greatly the other.

CHAP. XXV.

Of the accidents which bring on mildews.

THE reader will ſee from this account of the cauſe of mildew, what is the difference between that and the blight: that is occaſioned by a condenſation of the juice of the plant within, and this from a ſweating of it out. Though they are not the ſame diſorder, they are allied in their nature; but as their cauſes are different, ſo are their methods of cure.

The cauſe of blights is often a cold wind; but the occaſion of mildew is frequently a hot ſun, and a calm. This agrees with the rational account of theſe accidents; for cold is moſt likely to coagulate the juices in the veſſels, and heat to draw them out. The weakeſt trees and plants are moſt ſubject to blights, becauſe in them there is the leaſt force of nature to carry on the motion of their juices: but, the richeſt and ſtrongeſt are moſt ſubject to mildew, becauſe they bear the moſt abundant juices. Where moſt manure and tillage are uſed, the plants will be richeſt: therefore where there has been moſt dung uſed, the crop is moſt ſubject to mildew.

Let the huſbandman keep in mind the diſtinct nature of the blight and mildew: they require a different kind of caution; and in ſtarving his crop to prevent the one, he may run it into the danger of the other. There is at all times a great quantity of moiſture exhaled from trees and plants, and this, when there is not a due ſupply, may occaſion both the accidents of blights and mildew; the firſt in the ſpring, the other in ſummer. It is the opinion of Dr. Hales, than when the moiſture is exhaled from trees, in a cold ſpring, faſter that it is ſupplied from the root, this occaſions that blight in which we ſee the bloſſoms and leaves *: and, on the other hand, when in the heats of ſummer the quantity exhaled is vaſtly great, and the plant is rich in theſe ſweet juices, they may be drawn out when there is not a ſufficient ſupply of the others; and this the more, the greater the heat is, and the richer the ground has been made by manure.

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* Vegetable Staticks. vol. I. p. 368.

This is an accident which often happens without damage; but when the weather is leſs favourable there is great miſchief: this being the real cauſe of mildew. In the heat of the day this ſweet juice comes out; and while the heat continues it is not much perceived. It muſt have been rendered thin, in order to its getting out of the veſſels; and the heat which effected that change, keeps it in the ſame condition.

At ſun-ſet this juice would thicken from the cooler temperature of the air; but then the dews cover the ſurface of the plant with water; this blends with the thick juice which lies on the leaves, and waſhes it away. Whatever has been once diſſolved in a watery liquor, will readily diſſolve in it again; and as this thick ſweet matter was originally mixed with the watery juices in the veſſels of the plant, it naturally and readily will mix with the dew, which is alſo watery. This is philoſophy, and this is truth: the plaineſt words beſt convey knowledge.

The farmer ſees the natural and proper courſe of things, and in this there is no accident. No mildew is ſeen upon the plant, though the honey juice has been exſudated, becauſe it has been waſhed off again before it had time to do miſchief. If it had lain longer, it would have ſpread itſelf over the ſurface of the plant, ſtopped up its pores, and ſpoiled its growth; and it would have invited inſects to feed upon it, which would have ſpread the miſchief farther.

There are nights in which there is very little dew; and, in this caſe, as the thick juice will remain on the leaves, there is the foundation laid for the diſorder: but there are yet chances for the crop's eſcaping. If a ſhower falls the next day, it will waſh away all, and there can be no miſchief: if this do not happen, there is the chance of another night of dew, and this will ſtill take place. Even a third night's help from dew, after two dry ones, will anſwer the purpoſe if there be a briſk wind in the morning; but if otherwiſe there commonly comes on the damage. A wind, whether after rain or after dew, is of the greateſt ſervice againſt this diſorder; and it is for this reaſon corn, in open fields, eſcapes more than in encloſures.

The huſbandman will now underſtand the two fundamental points, 1. What is the cauſe of mildew; and 2. What are the accidents that bring it on. He will therefore have a rational foundation for his practice in guarding againſt the diſorder, and in endeavouring to remedy it, when it ſhall fall upon his crops in ſpite of all his caution.

CHAP. XXV.

Of the prevention of mildew.

WHEN his land is rich, and his crop ſtrong, let him be upon his guard to perceive this accident if it happen, that it may not be gone too far before he attempts a remedy. Let him provide againſt it by making his encloſures larger for corn land than for paſture; and by leaving openings at certain diſtances, at the height of about five foot.

This is a new practice, but it is of great importance. It may prevent half the miſchiefs that happen to crops of corn in encloſed ground. We have ſhewn, ſpeaking of blights, the neceſſity there is of the air having a free paſſage; and this is more or leſs obſtructed by encloſures. The winds that hurt a young crop come in only from certain quarters, theſe therefore may be defended thicker than the others: and the high opening we direct in other places will give all the advantage of winds without their damage.

When this is done there will be much leſs danger of mildew than on other occaſions; but as it will happen ſometimes in open fields as well as encloſures, this can be no abſolute remedy. When the days are hot, and there is little wind, and the nights are without dew, the farmer is to watch for fear of being ſurpriſed by mildews. He will find when the miſchief begins, and he will perceive this thick juice ſticking to the ſtalks, leaves, and young ears of his corn. It will diſcolour them, and he will find it firſt by his eye and then by the touch, for it will ſtick to his fingers. The conſequence is, that the crop withers; the veſſels that ſhould take in moiſture from the air, as well as throw out the abundant juices of the plant, are ſtopped up, and the proper courſe of nature is obſtructed. We have ſhewn in what manner trees and plants are kept in a healthful ſtate: this free paſſage of their leaves, and the reſt of their ſurface, is a vaſt article in their œconomy. The top of the corn plant uſually ſuffers moſt by mildew, and if it remain any time, though it ſhould afterwards go off, yet the corn never ripens kindly, and however the uſeleſs part of the plant thrives, the ear will be light.

It is of conſequence to know when this accident happens, becauſe whatever remedy is in the farmer's power muſt be applied in time, otherwiſe the miſchief will remain even after the apparent cauſe is removed. The field being known where mildews are moſt likely to happen, there muſt be caution uſed accordingly.

cordingly. As wheat is more ſubject to mildew in theſe places, than other kinds of grain, and as the freſhneſs of manure makes it the more liable to the accident, no ſmall encloſure that has been newly dung'd, ſhould be ſown with wheat: it ſhould in theſe places follow ſome other crop.

Of all the kinds bearded white is leaſt liable to mildew; this ſhould be ſown preferably to any other, in places where the mildew is likely to happen. The reaſon of bearded wheat eſcaping is, that its juices are thinner, though they be equally rich; ſo that when they are drawn forth by the ſun, they do not hang upon the plant in that clammy manner.

This ſhews the method of attempting to prevent the ſame accident by art, by thinning the juices of the plant. Manures take various effects, and the two contrary are dung and ſoot. The juices of plants enriched by dung are the thickeſt of all others; and the juices of thoſe enriched by ſoot are the thinneſt, although the encreaſe in grain be as great from one manure as from the other. For this reaſon let the farmer manure with ſoot, where he has reaſon to fear the mildew.

Thoſe reaſons have always moſt weight which are ſupported by experience, and we have its authority in this caſe. Hertfordſhire is the county where moſt ſoot is uſed as a manure, and no county is ſo free from this accident. The farmer will find the wheat which is ſown lateſt moſt ſubject to mildew. He will find this the moſt eſſential of all means for prevention of the diſorder. Mildews come uſually at a certain time of the ſummer; and the corn that is tendereſt is moſt ſubject to be damaged: when it has ſtrength, this accident will not be able to take much effect. Of all the times in the year Auguſt is the beſt for this ſowing.

In fine, if the farmer will give his encloſures air paſſages, ſow his wheat at an early ſeaſon after another crop, and with the advantage of ſoot dreſſing, he will need to have very little fear of this accident. It may happen at any time, but he will nine times in ten eſcape by this practice; and ſee his own fields healthful, while his neighbours are worth little.

CHAP. XXVI.

Of the remedies of mildew.

WHEN the crop has, by neglect of the cautions here laid down, fallen under the misfortune of a mildew, the farmer is not to give it up as loſt, but endeavour every thing for a remedy. The mildew is a clammy moiſture, which ſtops the pores. Nature waſhes it off by rains, and blows it away when diſſolved in dew by winds. If rain and wind come ſoon after, the farmer has nothing to fear; but a few days if they do not will be of vaſt prejudice; therefore this is the time he is to ſeize for the doing himſelf ſervice. If rain fall gently, and without wind, let him go into his field and ſee whether it have done the buſineſs: let him examine the corn by his ſight and touch, and he will ſoon find whether the remedy has been effectual. If he find the clammy liquor waſhed away he may ſit down in peace; but if it remain upon the corn he muſt prepare to aſſiſt in the remedy.

I have ſeen when a ſoft rain coming immediately after a mildew has been of the greateſt diſadvantage: the mildew has only lodged upon the tops of ſome plants, and on the ſtalks and leaves of others in ſmall parcels, corrupting them in particular ſpots. But ſuch a rain has diſſolved the thick juice without being able to carry it off. It has ſpread it in a kind of glazing over the greateſt part of the plants, whereas naturally it would have only affected a few places. This is the worſt ſort of mildew; and in this caſe art is to be called in.

Let him ſend ſtout and careful fellows in: let each of theſe cut a long, pliant, and well tufted aſh bough, and leave all the branches, ſhoots, and leaves upon them, except a few that may be cut off, for the convenience of handling them. Let theſe men divide piece by piece the whole field between them, and let them ſweep off the wet and mildew together, with ſoft ſtrokes of their aſh boughs. Theſe, with their leaves, will make a kind of bruſhes, which will ſweep off all without breaking a ſingle ſtalk. The ſtrokes are to be made firſt very gently down, and then with a ſlanting upwards, carrying on the boughs a yard or two before they are brought above the tops of the plants.

When a mildew is ſeen upon the crop, and there comes no rain to waſh it away, the firſt conſideration is, whether there be a favourable dew. In this caſe the ſame aſſiſtance may be given by art, as in the other; and the damage prevented. A briſk wind, blowing early in the morning, will carry it off: but, if there be none, ſome ſuch courſe muſt be uſed as in the former caſe: but as the dew hangs in larger drops, it will be eaſier diſlodged, and therefore a ſhorter method may be taken. To this purpoſe, a couple of men muſt be ſent into the field an hour before ſun-riſe, with a long cord; they muſt walk in the furrows at the diſtance of the length of the cord; and one holding one end, and the other the other, they are thus to draw it over the crop: this will lay ſo much hold, as to ſhake off all the dew-drops; and the clammy juice will go with them.

This is a ſhort method, and rarely fails; no injury is done to the corn, and the clammy juice, thus ſcattered on the ground, ſerves as a kind of manure; for nothing is richer, and the whole gets to the root. The boughs or the cord ſerve in the place of winds, to ſhake off the water in which the miſchievous matter is lodged. But ſometimes there may want alſo water. There may be no ſhowers, and the nights may yield no dew: this is a condition nearly deſperate: no bruſhing will diſlodge the clammy moiſture, when it is not diſſolved firſt; and even the ſtrongeſt winds would, in this caſe, anſwer no purpoſe.

If the crop be of ſmall extent, and there happen to be a pond near, the owner may ſprinkle over the whole with an engine, with a fan full of ſmall holes at its top; and, after this, the boughs or the cord will anſwer the purpoſe. Thus the mildew may be diluted and cleared off, by means altogether artificial: but there ſeldom are opportunities of doing it: indeed, never in the full extent in large concerns.

Corn is not the only crop which may require the huſbandman's care in this particular; all kinds are more or leſs liable to it, and he is to watch in every inſtance. Hops are no more exempt from mildew than other growths. There is no crop needs more careful watching. As ſoon as the leaſt appearance of it is perceived, after a ſhower, if any falls, or, if not, early in the morning, while they are wet with dew, let them be well ſhook, poles and all; if this do not prove ſufficient, let them be bruſhed with the aſh boughs: it will be eaſy with theſe leafy bruſhes to wipe over every part, and not bruiſe any. When there is rain or dew, this will be ſure of ſucceſs; and when there is neither, the engine muſt be called in to ſprinkle the plants. This may be done conveniently and eaſily in a hop-ground, though it can ſcarce be performed in a corn-field of any extent; and it will be very well worth the labour, becauſe it will anſwer a double purpoſe: it will at once clean the plants, and water the ground. This is always uſeful, in the higheſt degree, to hops, when the ſeaſon is dry toward the time of their growing to ripeneſs: frequently it will happen, that the produce ſhall be greater after this, than if no ſuch accident had happened.

CHAP. XXVII.

Of ſmuttineſs of corn.

DRY ſummers are the moſt ſubject to mildew; and, on the contrary, corn is moſt apt to be ſmutty in ſuch as are cold and wet. When the wheat is ſmutty, the grains, inſtead of containing a fine white flower, are full of a black powder of a diſagreeable taſte and offenſive ſmell. This debaſes the value of the grain more than any thing, and is apt to continue when it has once got footing. Sometimes it altogether alters the colour and quality of the flour; ſometimes it only affects it in part; but the leaſt article is much to be dreaded.

Nothing is more eſſenttial to the huſbandman than to know the cauſes of theſe accidents; nor is any thing more difficult: for thoſe who ſhould inform, are too apt to miſlead him. We have ſhewn him how, in blights and mildews, thoſe inſects, which come to feed upon the juices, are ſuppoſed to be the cauſe: and the caſe is the ſame here.

Mr. Bradley accuſes the eaſt wind of bringing inſects, which occaſion this damage, by eating up the proper juices of the corn, and mixing their own with it: and long after Mr. Turberville Needham ſhewed the royal ſociety, that in all ſmutty corn there were ſuch animals.

Wherever there is a corruption either of animal or vegetable ſubſtances, theſe inſects are to be found, but theſe writers take the effect for the cauſe. The maggots hatched from the eggs of flies in putrified meat, are no more the occaſion of that putrefaction, than the worms found in ſmutty wheat are of the ſmut. The decayed ſtate of each kind affords nouriſhment for theſe animals; and wherever there is place and food, pregnant nature ſends them. Their eggs fly about innumerably in the air, and though millions periſh, thoſe which happen to lodge where there is a proper place, will always live, and they will be enough to propagate their ſpecies, and continue the miſchief.

If the farmer ſuppoſed inſects were the occaſions of ſmuttineſs, and that an eaſt wind brought them, he would plant out the annoyance, and defend his fields againſt that quarter. But he would not be the ſafer from ſmut from this precaution; and nothing is ſo prejudicial as depending upon a wrong method.

The more learned ſay inſects are the cauſe of ſmuttineſs; and thoſe of the plainer claſs attribute it to the ſoil: but here the huſbandman will be as much perplexed as ever; one ſaying it is the over-rankneſs of the land which occaſions the diſorder, as Mortimer; another, that its poorneſs is the cauſe, as Blagrave; and ſome attributing it to both; as thoſe modern compilers, who have collected without examination, and wrote down without thought, the words of one author at the beginning, and thoſe of another at the end, though exactly contradictory. Others lay this accident on the conduct of the farmer: ſome tell him, that laying rotten vegetables on the ground, by way of manure, is the occaſion of ſmut in the wheat, as Worlidge; and others that ſmutty ſeed raiſes a ſmutty crop.

Among this variety of ſentiments, the farmer knows not which to credit: and wherever he fixes among them he will be wrong. We have ſhewn him what has been ſaid, that he may avoid paying too much regard to it; and ſhall direct him, by his own obſervation, to diſcover the cauſe of the diſorder; after which he will rationally proceed to the finding a remedy.

CHAP. XXVIII.

Of the real cauſe of ſmut.

HE will firſt ſee, on examining the nature of ſmutty corn, that there is a great deal of difference in the diſorder, according to the degree of it. When in the full height, the whole inner ſubſtance of the corn is black, of a nauſeous taſte, and a bad ſmell. In this caſe, if the corn be bruiſed, and ſteeped in water, it preſently ſhews innumerable worms, like little eels, living in every part of it.

When the diſorder is not arrived to this height, the inner ſubſtance of the corn is not entirely hurt, but the outſide is ſpotted with black; and, in ſome corns, a part of the flour within. The firſt is wholly deſtroyed; but the other may ſometimes be recovered for certain uſes.

When the huſbandman underſtands this difference, let him recollect the circumſtances of former years, and then examine the preſent: this way and this only will lead him to the truth. He will remember there have been certain ſeaſons when a great deal of corn was ſmutted; and others, where very little ſuffered. He will find all thoſe years, when there has been ſo much ſmutty corn, were cold and wet; and that thoſe which ſhewed leaſt, have been the hot and dry.

This firſt principle then will be eſtabliſhed in reaſon, upon the teſtimony of experience, that a cold wet ſummer is the principal cauſe of ſmuttineſs.

England is more ſubject to this than any other country; and it is owing to our frequent wet ſummers.

In Egypt no age ever ſaw a black grain of corn; for they have no rain: and even in Italy it is little regarded now; and was ſo ſlighted in earlier time, that the Roman writers have not a name for it. Modern writers, in that language, uſe for it words which properly expreſs blight and mildew: to both theſe the old Roman fields were ſubject, therefore they have terms to expreſs them; but this was little known, and leſs regarded.

In a wet ſummer, let the farmer examine his own crops and his neighbour's, and obſerve whoſe corn is infected, and in what degree. He will find a great deal infected in theſe ſummers: and that moſt which is upon the pooreſt land, and the wetteſt. Theſe are the two things that concur with an unfavourable ſummer, to occaſion ſmut, and he need look no farther for the real cauſe.

In moſt grounds there will be ſome ſmutty ears in ſuch a ſeaſon; but in theſe moſt; in proper and well managed land he will ſee but few, and thoſe ſmutted but imperfectly; a ſmall part of them will have the diſorder in its full force, having the corn converted to a black duſt, the reſt will be only here and there ſpotted on the ſurface. Next let him examine a poor land, not particularly wet, and he will ſee moſt of the corn there ſpecked and ſpotted, tho' but a ſmall part is abſolutely rotted with the ſmut; but in a field that is poor and wet both, he will find it perfectly ſmutty.

This will be the natural reſult; and he will no longer attribute the diſorder to inſects or eaſt winds. He will perceive in the ſame kind of ſoils a great difference in the degree of the diſorder, and this will lead him to examine into the occaſion; which he will find to be the better management in ſowing: and the change, or the preparation of the ſeed. He will know, that neither the richneſs of the land, nor any kind of manure, are the cauſe of ſmuttineſs; and he will not be afraid to enrich his land in general, nor to uſe any kind of manure in particular; but will know, that the ſeaſon is the great cauſe; and as it takes moſt effect on the pooreſt and wetteſt grounds, he will bend his mind to the draining and enriching thoſe lands; and will conſider that every thing which impoveriſhes his ground is a cauſe of this diſtemperature; and every thing that puts it in heart, a defence againſt it.

CHAP. XXIX.

Of the preventing of ſmuttineſs by a due care of the land.

TO prevent ſmut every thing is to be done that can give ſtrength to the crop. The two chief articles are tillage and manure; and of theſe great tillage is beſt for the preventing this diſorder. I have ſeen lands, where no care about the ſeed and other articles could prevent frequent ſmutty crops, which have yet been cured by repeated plowings.

As ſmut may ariſe from theſe ſeveral cauſes, too abundant moiſture, poorneſs of the land, and an ill conduct in the ſowing, let them be ſeverally guarded againſt: every thing the farmer does to prevent ſmut, will alſo enrich his land. He will by this rational conduct not only ſecure to himſelf a cleaner but a larger crop. If his land be poor let him uſe the ſeveral methods we have before related for the improvement of it; and if liable to wet let him lay it high, and cut the furrows deep and in proper direction. This we have explained at large already, ſo that it needs only be named here.

As a great deal of tillage is the beſt way of enriching land to prevent ſmut, it follows that the horſehoeing huſbandry is particularly calculated to prevent this damage; and this is confirmed by experience. Land managed in this method is not nearly ſo ſubject to ſmutty crops, as that in the common courſe of huſbandry. As we no where recommend tillage alone, it is needful here to ſpeak of the kind of dreſſings that are moſt proper with it.

As dampneſs has a great ſhare in occaſioning ſmut, he ſhould chuſe the dry and warm manures: freſh dung is the worſt dreſſing for a piece of land inclined to ſmut; and of all that can be choſen, lime is the moſt proper. There is no part of the kingdom ſo free from ſmut as Derbyſhire, where they uſe a vaſt deal of lime; and in general, places where it is moſt common, are thoſe in the neighbourhood of great towns, where there is abundance of dung.

CHAP. XXX.

Of the prevention of ſmut by the conduct in ſowing.

THE crops which are moſt ſubject to ſmut are ſuch as are ſtarved, and ſuch as are chilled. The farmer will recollect that there is, beſide thoſe we have named, another article which always tends to impoveriſhing a crop, which is the ſowing the ſame ſeed again and again upon the ſame ground. Whatever tends to impoveriſhing the crop, tends in the ſame degree to the ſubjecting it to ſmut. The change of ſeed wheat is eaſy, becauſe it is every one's intereſt: as the farmers of different parts are to be mutual gainers, they will be ready at all times to do it.

There has been an opinion, that ſmutty grains will grow up into a ſmutty ear: but they will not grow at all: however, they will do as much damage in the ground as if they did: they will ſpread the infection of their juices in the land, and produce the ſame effect. The ſmutty grains break and diſſolve in the ground, at the ſame time that the others ſwell and ſhoot out their roots: when theſe are taking in their firſt nouriſhment, the rotted corns of the ſmutted kind afford their juices to them: they take in this, and it gives a tendency to ſmuttineſs in the whole.

This will ſtand as a caution to the huſbandman, that when he ſends corn in exchange, he does not for his credit ſake ſend ſuch as has any ſmut among it; and that when he receives ſeed corn from another, he look it carefully over, before he prepare it for ſowing. Clean ſeed is ſo neceſſary on this occaſion, that he ſhould not ſuffer a grain to be ſowed that has the leaſt ſpeck upon it; nor any that has been waſhed or otherwiſe cleaned; for it is not certain, that any cleaning of grain once ſmutted, can make it fit for this purpoſe.

Nothing can prevent a piece of wet ground ſown with ſmutted corn from being ſmutty; but a crop that would have been liable to this accident from any apparent cauſe, will be more likely to eſcape, if the ſeed have been changed. This always makes the growth, under equal circumſtances, more vigorous; and the heartier it is, the more ſafe from this accident.

Change of ſeed is a very good method; but the other precautions we have named have a right to the ſame regard. Every change of ſeed will be of ſervice, both againſt ſmut, and in favour of the growth; but the nature of this exchange being well conſidered, the advantage may be doubled. The ſoil makes a great difference in the condition of corn for ſowing.

Wheat that has grown on dry ſandy ground, never ſucceeds ſo well as that from other ſoils. As the ſandy is the worſt land for getting ſeed wheat for a change; the beſt is the clayey. This will thrive in a land of the ſame kind, or in a loam, or even in a ſand.

When the ſoil is clayey to which the wheat is to be brought, none is ſo proper as one of the ſame general nature; but it ſhould not be in every reſpect alike, becauſe that will be like ſowing the ſame corn upon the ſame land: the colours of clayey ſoils ſhew their differences: and by them we may judge.

A white clay is the beſt ſoil to take ſeed from that is to be ſowed on a red; and a black clay furniſhes the beſt wheat for a yellow: in the ſame manner, interchangeably, the wheat that has grown on yellow is good for black; and that from red for the white. In general let the farmer get his ſeed from a ſound ſoil at a diſtance from his own land; and if he can, let him get it of ſome one who changes it yearly himſelf. Seed of this kind ſown on land prepared as we have directed, will be ſecure from ſmut.

In the common courſe of huſbandry, the changing the crop upon a piece of land, is a needful caution to prevent ſmut. This depends on the ſame principle: often ſowing the ſame crop makes it weaker; and where wheat is weak, any unfavourableneſs of ſeaſon will make it ſmutty. In the horſe-hoeing method this change of the crop to the ground is not neceſſary, tho' a change of ſeed from ſome other place is. In this new method, though the ſame field be ſown with wheat ten years ſucceſſively, the growth will never be any two years in the ſame place; ſo that while the crop is encloſed in the ſame hedges, yet it annually grows in a different parcel of the ground. This is ſufficient; for if the ſeed be changed every year, though the ſame field be thus ſown with wheat ever ſo long, not an ear of it will be ſmutty.

CHAP. XXXI.

Of preparing the ſeed againſt a ſmutty crop.

THE ſteeping of ſeed corn is in no article more ſerviceable, than in preventing ſmut. When the former precautions have been taken for the procuring the right ſeed, and dreſſing the land, if this be added there is little fear of ſucceſs. In general, the earlier wheat is ſowed, and the better it is ſteeped, the leſs it is liable to be ſmutty. Early ſowing makes the growth ſtrong, and the advantage of ſteeping is the ſame; for it makes the crops more vigorous.

Of the various methods that have been propoſed for brining of ſeed wheat, the plaineſt and moſt familiar are beſt. Receipts are publiſhed abundantly, in which copperas and allum, and urine, and the like offenſive ingredients are recommended; but this is the act of fancy, not of judgment. Men think they ſhew the more ſkill, the more ingredients they crowd into the liquor; as thoſe old phyſicians, who in the compoſition of Mithridate and Venice treacle, ſeem not to have conſidered what would be beſt for the purpoſes of the compoſition, but how many things they could get into the preſcription.

We would have the farmer underſtand the deſign of every thing he does, and he will then find all this parade is quackery, the jargon of a ſtage doctor to conceal ignorance. Thoſe who do not know which ingredients uſed in the ſeveral receipts for ſteeping are beſt, put in all, that they may be ſure to have the right among them: but the intelligent farmer ſhould know the intent of each, that he may be able to chuſe with wiſdom on any particular occaſion.

In the preſent caſe, all that he expects from the ſteeping liquor, is to give the plants a ſpeedy and firm growth; let him therefore reject all thoſe ingredients, which have been introduced for other purpoſes; and uſe only thoſe which tend to promote the growth. Theſe are two, ſalt and lime, and all others are to be rejected. Let him pour the ſeed wheat into a large tub, and pump a good quantity of water upon it: let him ſtir it well about with a ſtick; and then leaving it to ſettle pour off the water, and pour away all the light grains. Then let him pump more water upon it, and ſtir it about; and repeat the ſame till it has been waſhed four times: by this means the wheat will be well damped and perfectly clean, and every light grain will be ſeparated.

When the wheat is thus ready for ſteeping, prepare the brine in the following manner. Pump a ſufficient quantity of water into a tub that has a tap to it, and put in as much ſalt, weighing what is put in, as will, when diſſolved, make the brine ſo ſtrong that an egg will ſwim upon it. This is juſt half the ſtrength that is required; therefore let as much more ſalt by weight be put in, and then let all be well ſtirred about till it melts. When the ſalt is melted put in the wheat and ſtir it well about. Let it lie two nights and a day, that is, put it into the brine one evening, and it will be done enough by the evening but one afterwards. When it is taken out of the brine, let it be well covered with ſifted lime, and then it is ready for ſowing.

CHAP. XXXII.

Of the cleaning of ſmutty corn.

IF the farmer follow theſe inſtructions, he will have very little reaſon to complain of ſmut. But he may, before he gets into the uſe of this method of prevention, have a ſmutty crop, and we ſhall not leave him uninformed of the methods by which he is to make the beſt of it.

Thoſe ears that ſhew themſelves to be utterly rotted, ſhould be picked out; and the reſt when thraſhed may be managed in the following manner. Let the whole quantity be put into a very large veſſel, and water in abundance poured upon it: let it be very well ſtirred about in the water with a new birch broom, and this repeated ſeveral times with freſh waters, till all the blackneſs is got off, and the wheat looks like other corn, only for the wetneſs. Then ſpread it upon ſheets, or any other cleanly way, to dry in the ſun, and turn it from time to time till it be dried perfectly; after which it will be fit for uſe. This is not to be uſed as ſeed wheat, for the leaſt remains of the ſmut would endanger the new crop; but provided the worſt of it have been carefully picked out, there will be no harm in the uſing it for bread, or any other purpoſe.

Wheat when ſmutted to a great degree, is unwholeſome; and ſhould not be eaten; but when the defect has been moderate, and the worſt is picked out, the remainder may be uſed without danger.

In ſome places they ſoak their wheat in water ſeveral hours, to get off the blackneſs, by rubbing it afterwards in the water;

but when corn is ſo bad as to require this, it is, honeſtly ſpeaking, too bad to uſe. In this caſe, as the water has penetrated the very body of the grain, the ſun and air will not be enough to dry it. They for that reaſon put it to dry in a kiln, in the manner of malt, and afterwards ſell it; but this every one ſhould be guarded againſt, not only with reſpect of ſowing, but for the common ſervice, as the bread of families.

In reſpect of ſeed corn, that ſhould be of the choiceſt and pureſt kind, ſo that any impoſition upon the farmer in the ſelling for that purpoſe, is cruel in the higheſt degree. When he is obliged to buy his ſeed corn, he muſt be very nice in the examination of it; and he may diſcover whether any trick of this kind, more or leſs, have been played with it, by the ſight and taſte. Fine and perfect wheat ſhould look ſhining, and all of a colour; if it be dim on the ſurface, or of different hues, it is to be ſuſpected. The ſweet taſte of good wheat is alſo well known to the farmer, and no art can give this to ſuch as has been waſhed.

In Flanders they go farther in cleaning of their wheat that has been ſmutted; they have a large hollow machine, made of plates of tin ſet in a wooden frame. Theſe plates are all pierced full of holes inward, ſo that the inſide is like the rough ſurface of a nutmeg-grater. When their corn is ſmutty they firſt ſteep and waſh it carefully in water, and then, when it is ſomewhat dried, they put it into this machine and work and ſhake it about; the conſequence is, that the black ſpots are in part grated off, and in part concealed; and this is ſold for bread, and is often the occaſion of great diſorders.

The great article to prevent the miſchief, is uſing a proper kind of manure, and a due quantity of it, with ſufficient tillage.

Having gone through the care of the land, and management of a crop, nothing remains for the compleating this part of our work, but informing the farmer how he may beſt preſerve his corn when he has reap'd and thraſh'd it. This we ſhall give in the words of a correſpondent, to whom we have been often before obliged on the moſt intereſting occaſions, and whoſe diſcoveries and improvements on this head demand the thanks of the publick, more than the labours of moſt other enquirers.

A Deſcription of a VENTILATING GRANARY,

For the preſervation of corn in a ſtate of reſt; with the plan and conſtruction of it: alſo, ſome obſervations and directions about ſound, and tainted or ill-ſaved wheat, with reſpect to their preſervation in this kind of granary.

Principles upon which this granary is built.

AIR, conſequently dryneſs and coolneſs, duly adminiſtered together, with ſufficient ſecurity againſt vermin, ſeem to be the eſſentials neceſſary to the moſt convenient methods of preſerving corn, for all its uſes, for ſeveral years together in a granary or magazine, without ſtirring.

N. B. A granary or magazine, on theſe principles, ſhould not be built in a confined ſituation; as, near the ſhade or ſhelter of trees or buildings, but where the oppoſite eaſt and weſt ſides of ſuch granary may be properly expoſed to thoſe points: in which caſe moſt of the intermediate points between them and the north and ſouth, will act upon this granary more or leſs, according to the velocity of the wind, by fixing the folding-doors thereof properly, at ſuch times when the corn is to be ventilated.

References to the PLAN.

Plate 1. Elevation of the granary or magazine to be built of brick or ſtone, of various dimenſions, according to the occaſions of the owner; but here (as a ſpecimen) only 46 feet long by 17 broad, from out to out.

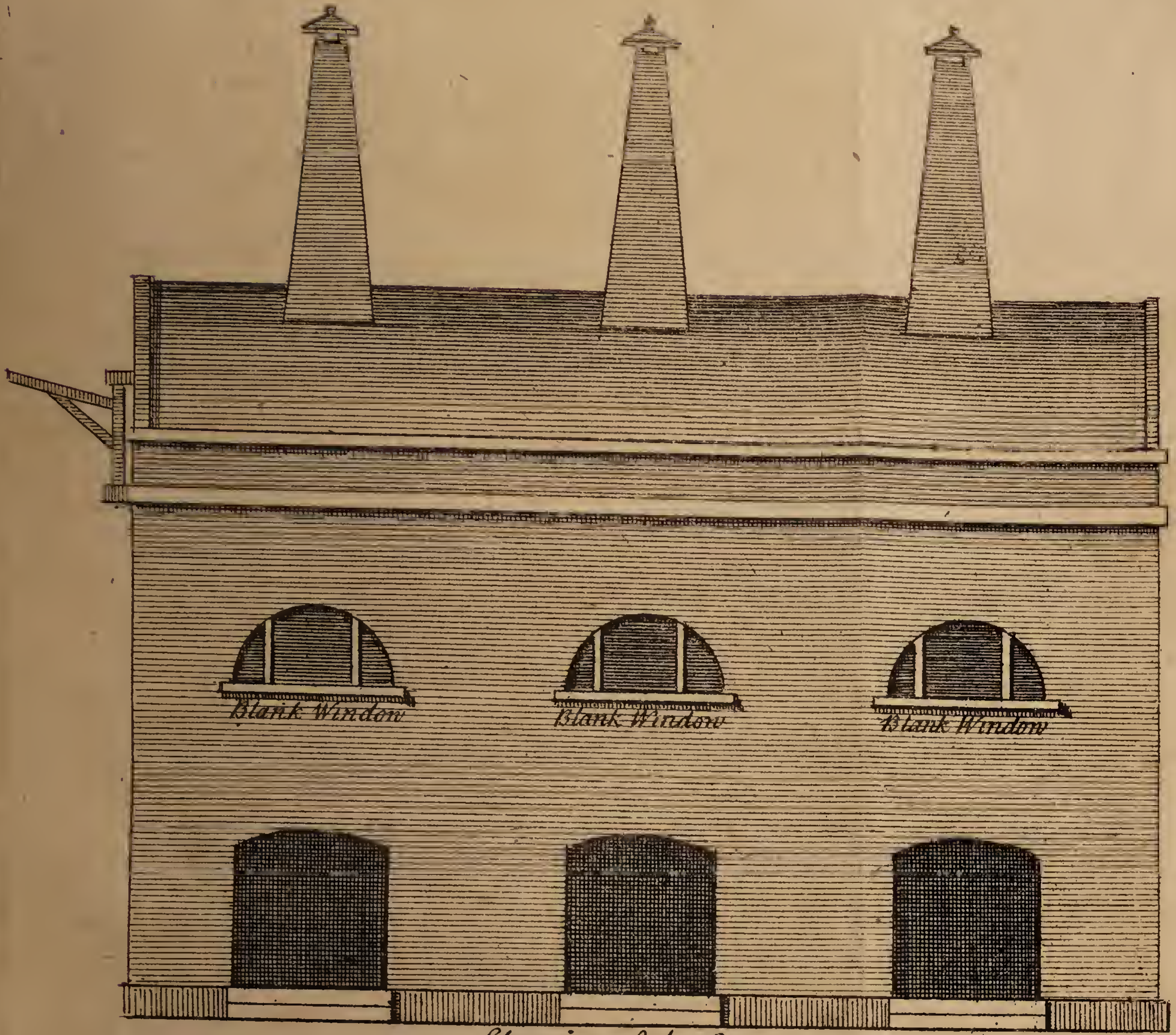
Plate 2. Section of the granary lengthways through the middle.

B. B. B. B. The garret, all in one chamber, into which the corn may be received by means of a crane, or pully fixed over the door (k) (plate 1.) on the north gable of the building; to which door a ladder, or flight of ſtairs on the outſide of the ſaid gable may communicate. This garret may occaſionally be made uſe of as a ſtore room for corn, that has already been preſerved two or three years in the chambers below, marked (C. C. C.) or for other kinds of dry goods, leaving a few air holes only in the gable ends of this garret ſtory.

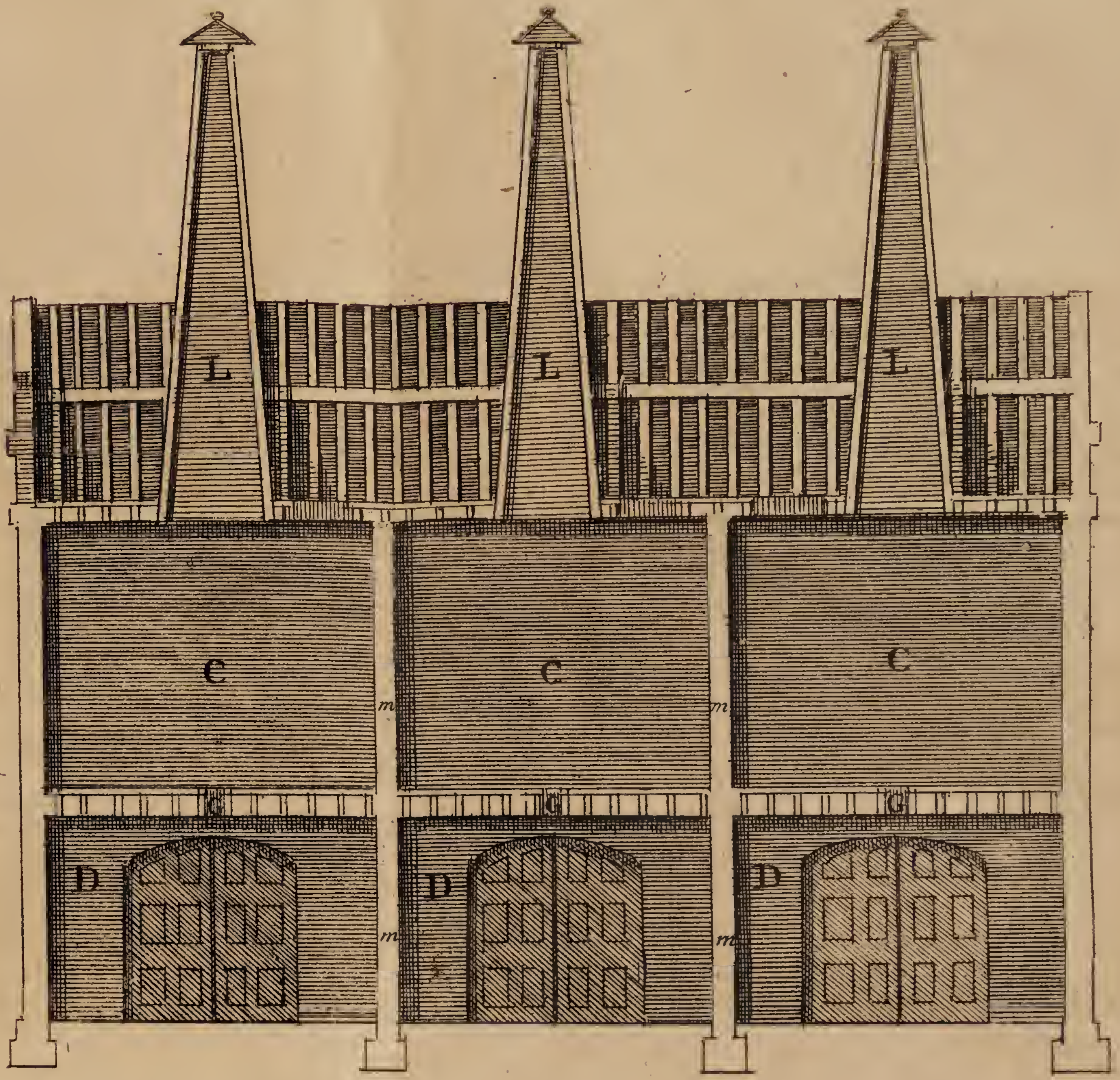
C. C. C. Three chambers where the corn is to be firſt repoſited, in order to receive the neceſſary ventilations for a year or two, or more, till perfectly cured or ſold; each chamber here, about 13 feet ſquare, by 12 high; to be divided from each other by brick partitions (m.m.) carried up from the ground. The ſides of theſe chambers to be neatly covered with ſtucco plaiſter.

G. G. G. The floors of theſe chambers, to be ſupported with whole double deals laid edgeways, and covered with narrow deal boards,

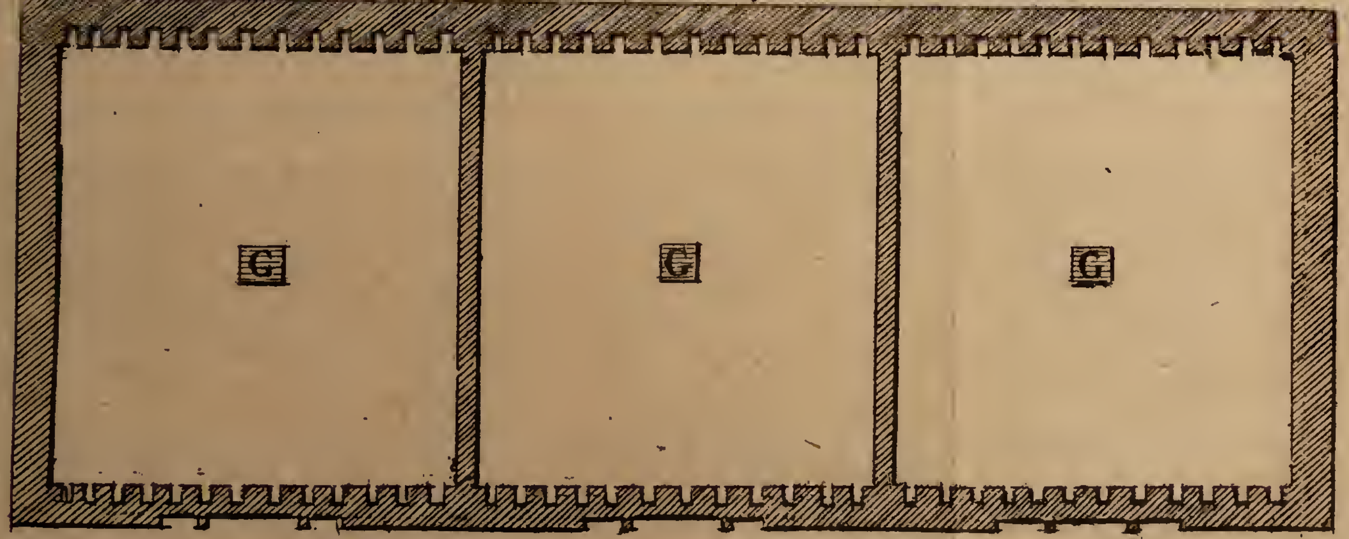
A Ventilating GRANARY for the preſervation of CORN in a ſtate of Reſt.



Elevation of the Granery.

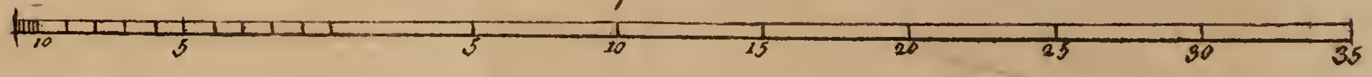


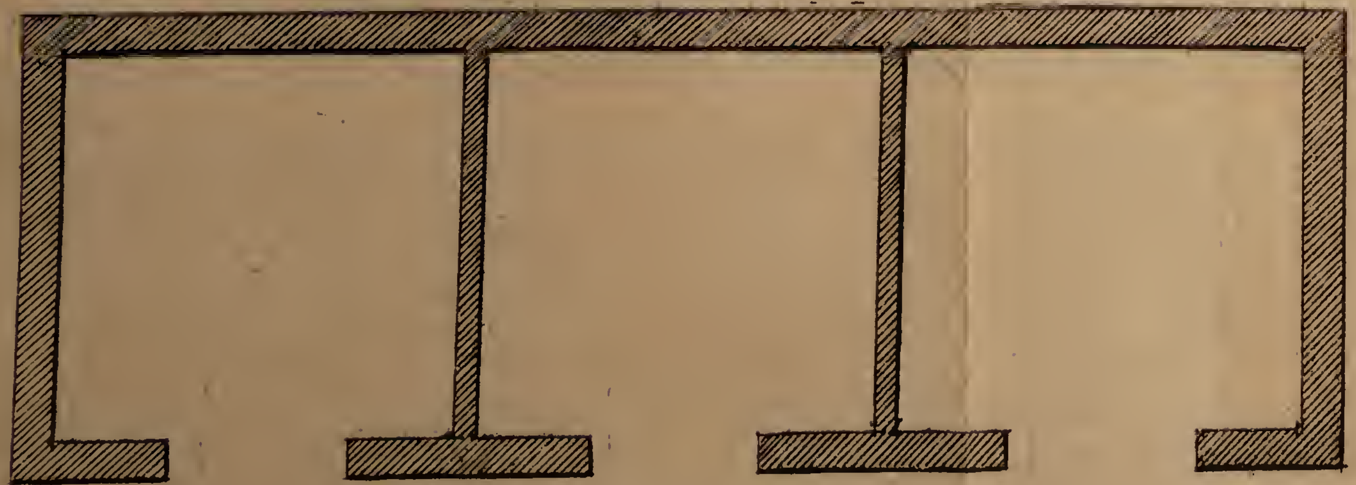
Section of the Granery Length ways through y^{e} Middle.



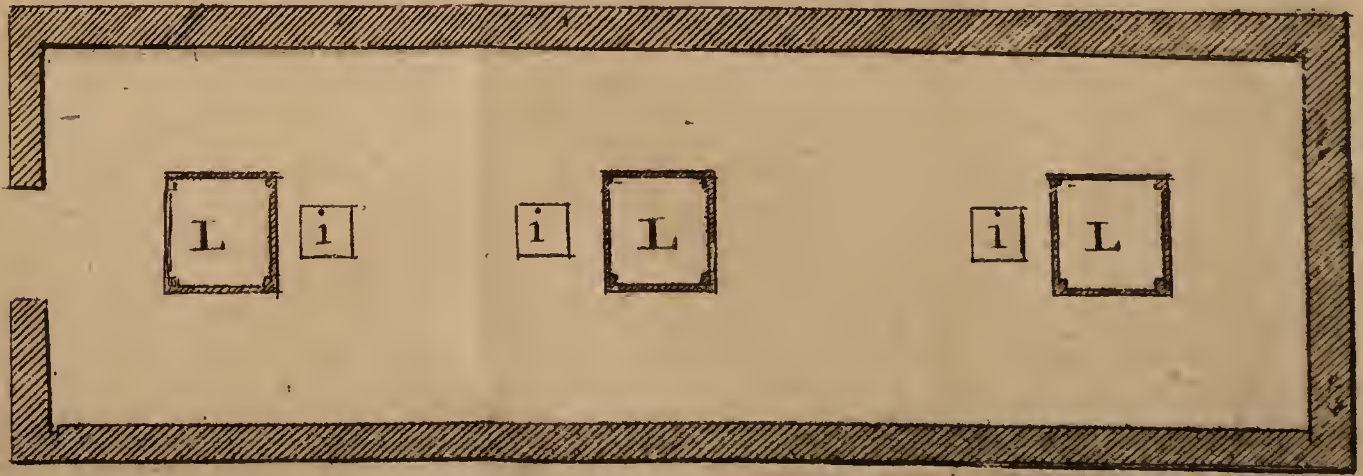
Plan of the Chamber floor where the Grain is to Lay

A Scale of Feet.





Plan of the low floor.



Plan of the Garret floor.

boards, not exceeding ſix inches in breadth, leaving a ſpace of near an inch between each board, that room may be given for the air to aſcend equally through theſe ſeveral interſtices in the floors, in order to ventilate the corn contained in theſe chambers, as occaſion requires. (vid. plate 3. fig. 1.) Theſe floors, or at leaſt the interſtices between the boards, to be covered with cloſe wire grating, that will not admit the grain to paſs through; or the floors may be covered intirely with a proper thin, but ſtrong hair cloth, nailed down round the confines of the floors, before the corn is lodged.

G. G. G. Small trap doors (vid. plate 3. fig. 1.) to be made a foot ſquare each, one in the center of each floor; which may be opened occaſionally, to let out the corn into the ground chambers for uſe or ſale; and may at ſuch times, if a briſk wind ſets in and through the ground chambers, prove a good winnowing to ſuch corn to prepare it for market, eſpecially if the ſaid trap doors be humoured by the hand, ſo as to let fall the ſtream of corn thin and diffuſed on the clean ground floors. Theſe trap doors to be free from wire grating or hair cloth over their dimenſions; to be affixed by hinges, ſo as to open into the ground chambers; at other times kept faſtened with a croſs iron bar ſtaple and padlock, to prevent imbezelment. The ceilings of the chambers C. C. C. muſt be made as much air proof as may be, either by ſome excellent cloſe plaiſter ceiling, or only by caulking the joints in the garret floor above, pitching the ſeams afterwards, and daſhing drift ſand on the ſeams after the hot pitch bruſh, by which means no air can paſs out of the chambers C. C. C. except throught the flues (L. L. L.)

L. L. L. The flues, to be made of a piramidal figure, with beams erected at the four angles of each flue, well barred and braced together, and covered with laths and plaiſter, ſo as to be tight and air-proof; to be four feet ſquare each at their baſes, and well fixed in the garret floor, and to the roof timbers; to be erected directly over the trap doors (G. G. G.) and elevated twelve or fourteen feet above the ridge of the roof of the building; their openings at their tops to be a foot ſquare each; a piece of braſs net-grating to be fixed half an inch within their muzzles, to prevent ſparrows or other annoyances deſcending to the corn below, and alſo to admit of a cover or valve, falling cloſe on their muzzles. Theſe muzzles to be well guarded from rain and ſnow by proper umbrelloes, elevated a little above them, and well fixed to the continuation of the four beams of the flues. The valves juſt mentioned to be made of ſquare pieces of oak board, exceeding the ſquare dimenſions of the orifices of the flues, by two inches on every ſide; a plate of lead of five or ſix pound weight, to be nailed on the top of each valve; the valves underneath to be lined with buff, well ſoaked in pickle, to attract the moiſture of the air, ſwell and ſtop cloſe. Theſe valves to be open or ſhut by means of a ſmall cord, faſtened to a very ſhort croſs ſling of the like cord, which croſs ſling communicates, and is made faſt to four ſtaples in the four corners of each valve; that the valves may be raiſed and lowered evenly on their reſpective muzzles, by means of the ſmall cord paſſing over a pully fixed under the center of the umbrello, and down between the lath and plaiſter; and the boarded lining of the flue comes out to hand in the garret, through a ſmall hole in one ſide of the flue; which hole ſhould be made through a piece of wood fixed in the framing of the flue; and the upper edge of the ſaid hole, on the inſide of the flue, ſhould be guarded by a ſmall roller of wood, to eaſe the friction of the cord upon drawing up the valve, and keeping it in that ſituation by a weight ſomewhat ſuperior to that of the valve itſelf, hung to the cord end in the garret, or the cord may be made faſt to a hook in the garret floor, making allowance for the lengthening and ſhortening of the cord by the weather, that it may not be in danger of breaking; theſe valves or covers ſhould alſo be guided in their raiſing and lowering, by four fixed upright ſmooth wooden bars, which may lodge them equally on the ſquares of their reſpective flue mouths. Theſe valves or covers might be contrived to be opened and ſhut by other methods, but this ſeems to be one of the moſt ſimple, and leaſt liable to diſorders and repairs. The chief uſe of theſe valves (and a very conſiderable one) is the keeping out the moiſt foggy air from deſcending upon the corn, when the granary is not to be ventilated.

i. i. i. Trap doors in the garret floor, for laying in the corn into the chambers C. C. C. to be two foot and a half ſquare each, well fitted to their receiving jambs, and made tight with clay well tempered with ſalt and water, after the chambers are charged with corn.

D. D. D. The ground, or loweſt chambers that ſhould be admitted in a building of this nature, the ſides of which to be ſmooth plaiſtered, that rats or mice may not be able to aſcend to the corn floor, nor ſhould any goods or lumber be admitted into theſe ground chambers, becauſe they would diminiſh the diameter of the quantity of air to be admitted into them, and conſequently of its weight and preſſure neceſſary to force its way up through the interſtices left in the corn floors, as before deſcribed.

E. E. E. Large folding doors to each ground chamber, opening outwards, which when ſet open and properly fixed may catch the drying ſide winds, and direct them into their reſpective chambers. The like folding doors to be on each ſide of the building, eaſt and weſt, oppoſite to each other, ſo that upon ventilating the corn above, the windward doors only are to be opened; at all other times, when moiſt weather prevails, all the doors, as well as the valves beforementioned, to be kept ſhut and cloſe as poſſible; for which reaſon theſe folding doors are to be truly fitted to their jambs, as alſo to their upright center poſts where they meet, bolt and lock, or by a ſtrong croſs bar and pad-lock on their outſide; and the borders of theſe doors, at all their meetings on the inſide, ſhould have a liſt of buff nailed round them with ſprigs, in order to prevent an indraught of moiſt and foggy air, as much as poſſible.

Mice and other groſs vermin, will find great if not inſuperable difficulty, to get admittance into this granary; and inſects infeſting it, may be deſtroyed by brimſtone ſet on fire occaſionally in the ground chambers, keeping the folding doors, as well as the valves above, cloſe ſhut at ſuch times of ſtoving, and it ſhould be well ſtoved before it be repleniſhed with corn.

It is ſufficient only to remind many people, that the acid fume of brimſtone confined, kills all inſects within its circulation, and no doubt diſcourages their approach for ſome time after; and may probably tend to abate fermentation in the grain, which is generally, if not always occaſioned by ſuperabundant moiſture and heat.

REASONS *offered for the operation and effects of this* VENTILATING GRANARY.

When the dry ponderous air is directed into the ground chambers by their folding doors, and ſtrongly preſſed in by the continued impelling force of its own current; being there accumulated, it will endeavour to expand itſelf on every ſide, by its own elaſtick ſpring: and ſo paſſing through the interſtices, before-mentioned, in the floor above it, as the leaſt reſiſting vents will inſinuate itſelf through the wire grating or hair cloth, into the numerous interſtices between the grains of corn; through which its motion will be greatly expedited by means of the flues above, when open; as the air at their tops being above forty feet from the ground, will be much rarer than in the ground chambers below, where it will be greatly condenſed by the preſſure of the ſuperincumbent atmoſphere, and alſo by the impelling wind or current of air continually driven into the loweſt chambers. The air therefore, always endeavouring to expand itſelf in the loweſt chambers, to thoſe parts where it finds leaſt preſſure and reſiſtance, will continually tend from the loweſt parts upwards, and ſo produce an adequate circulation of air through the whole bulk of corn, whereby it will be ventilated and kept cool, dry, and ſweet, though in a ſtate of reſt, for ſeveral years together, and longer than the private owner ſhould lie out of his money.

Farther obſervations on the uſefulneſs of this kind of granary.

In this kind of granary, wheat may be lodged in bulk ten or twelve feet ſquare every way, or whatever the ſquare contents of the corn chambers be, the wheat may lie therein within a foot, or half a foot of the ceiling, but half a foot is a good diſtance at firſt laying in the corn, for it will ſoon ſink lower as it dries. This is a vaſt advantage in ſtowage over the old granaries, where they dare not lay the wheat for a long time after laying it in, above eighteen or twenty-four inches deep, and that too, frequently turned and aired by hand-labour and expence, for fear of its heating, muſting, and breeding the wevil; whereas this kind of granary, ventilated as it were, per ſe, and in a manner without any trouble or expence attending it, will preſerve at leaſt five times the quantity of wheat upon every foot of its flooring, more than the old-faſhioned granaries can do.

N. B. The ground chambers need not be above ſeven feet high, under the floor timbers; and a brick floor, or one of clay, lime, and ſmiths duſt well tempered together, is fitteſt for the ground floor.

In large military or publick magazines, greater bulks of corn may be ſupported by upright props under the floors, and the ventilation proportioned by adding more flues to each corn chamber, and proportioning the dimenſion of the folding doors thereto, or the number of them.

The author having never ſeen or heard of any granary of this kind in practice, ſubmits it to publick ſcrutiny, cenſure, or improvement.

The diſtinction and difference between ſound and tainted or damaged wheat, and their different treatment in order to their preſervation in this kind of granary.

If wheat be dry and well ſaved at harveſt, free from black, blighted, or ſooty ears, has afterwards had its due ſweat and melioration in rick, cock, or barn, for five or ſix months, and after threſhing out has been well cleanſed and ſcreened; ſuch wheat may truly be called ſound, and when lodged in this kind of granary, may be eaſily preſerved therein for many years, by ordinary and moderate ventilations.

For inſtance, being thraſhed out in January or February after reaping, well cleanſed, and lodged in this granary; it may be ventilated once a week, if opportunity offers, for the firſt two or three months in ſpring, which will be a great advantage to the grain, before the ſultry heats of ſummer come on, when it ſhould be ventilated as often as a proper breeze or gale of wind offers, and once a month, a few matches of brimſtone ſet on fire in the ground chambers, as before directed; in the autumn, the winter, and ſpring following, two or three times a month may be ſufficient to ventilate, without applying the brimſtone fumes; but the ſecond ſummer ventilate twice or thrice a month, and apply the fumes once or twice during this ſecond ſummer; after which time it may be ſufficient to ventilate once a month during the ſecond autumn, winter, and ſpring, and twice a month during the third ſummer, when it may be ſaid to be thoroughly cured.

It may not be amiſs, during the firſt year or two after the wheat is lodged in this granary, to inſpect the condition of the corn, by opening the trap doors in the garret floor, eſpecially in ſummer time once or twice; for as moiſture or vapour of the corn will always riſe to the ſurface of the bulk, though the center may be dry, ſo the appearance of the ſurface, as to moiſture or dryneſs, may regulate the number of ventilations neceſſary for its preſervation.

It is certain from experience, that ſound corn that has been well preſerved in common granaries, by frequent turnings and winnowings, and afterwards laid two or three foot deep, or more, ſeldom ſweats, gives, or ferments after the firſt two years, except it receive accidental wet or moiſture, from which it is eaſily freed with a little care; whereas it is a long time parting with its natural internal moiſture, which is the greateſt enemy to its preſervation.

It is no leſs certain that wheat, being well preſerved by any method whatſoever, has, after ſeveral years ſo kept, been found to produce more and better flour for bread, than ſome of the ſame field and crop did ſoon after its being threſhed out; becauſe the aqueous humidity of the grain evaporating by keeping ſome years, the flour comes cleaner from its thin bran under the ſtone.

It is equally certain, that wheat ſo preſerved for ſeveral years, has proved very good ſeed corn, and probably not ſo liable to produce the ſmutty ear; exceſs of moiſture, either in the ſeed, the ſoil, or the ſeaſons, being the chief cauſe of that grievous complaint, except the ſeed itſelf be ſmutty, and then the crop alſo will be ſmutty notwithſtanding dry ſeaſons.

But if wheat has been ill-ſaved at harveſt, or be in a contrary condition, in any or all reſpects, to the ſound wheat deſcribed above, which would certainly give it a ſtrong tendency to heat and fermentation, in a bulk of ten or twelve feet deep, and ſo induce the wevil, and other maladies, to the further damage or deſtruction of the wheat. It will therefore, in this caſe, be neceſſary firſt to cleanſe well by ſcreen or tryer, after which give it a very gentle and ſlow drying upon a kiln, equal only to a ſtrong ſun heat, till the grain be ſomewhat hard under the teeth; then laying it on a floor to cool, for ſome hours, put it into ſacks half filled and tied faſt, and ſo rub the wheat well therein on a ſmooth floor with both hands, frequently turning the ſacks over every way, in order to looſen and free the grain from its black ſooty duſt; then winnow clean, after which it may be laid into this granary ten or twelve feet deep, and there treated in every reſpect like wheat originally ſound.

Such wheat, after ſuch treatment, will turn out much better for bread, though kept two or three years or more in this granary, and ſell for a good deal more money than it would have fetched in its firſt tainted and foul condition.

Yet ſuch wheat, though by this method made proper for bread, ſhould by no means be uſed for ſeed; for kiln-drying, more or leſs, abates or deſtroys its vegetative quality; and even without drying, a diſtempered ſeed ſeldom or never fails of producing a diſtempered crop.

J. Stevenson.

End of the Twelfth Book.

A
COMPLEAT BODY
OF
HUSBANDRY.

BOOK XIII.

Of the diſeaſes of cattle, and their remedies.

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The

The INTRODUCTION.

WE have gone through every article of the farmer's concern reſpecting the choice of his cattle, and the growth and management of his crops. We come now to conſider thoſe diſorders to which cattle are liable, the methods of guarding againſt them, and the medicines moſt approved in their cure.

We have had occaſion to obſerve, on many occaſions, how greatly the farmer is miſled by thoſe who ſhould give him information in reſpect of the management of his crops; but the preſent is an article leſs underſtood, and more injudiciouſly treated: and it is, at the ſame time, of the greateſt concern. The loſs of his cattle is not to be recruited but at a very conſiderable expence; and the care of them is, in general, committed to perſons ſo ignorant, that little better than their abſolute loſs can be expected when they fall into any conſiderable diſorder. They muſt have ſtrength indeed, if they eſcape from their diſeaſes, and ſuch doctors.

While thoſe who undertake the cure of theſe creatures are ſo ill qualified to ſucceed in it, the farmer is leſs able to judge right, than they are to act. It is a part of needful knowledge fartheſt of all removed from his enquiries. A few names of diſorders got by rote, are generally the whole ſtock of the country farrier's knowledge, and theſe he applies to any diſorder that comes before him; boldly, becauſe he knows none can contradict him. A ſmaller ſtore of remedies ſerves his purpoſe: his phyſic he uſes as much at random as the names of diſorders; and the unhappy farmer is ſtripped both of his cattle and his money. If they deſtroy the beaſt, he is perſuaded the violence of the diſorder killed it; and ſatisfies his mind that he has done all he could.

We ſhall deliver here nothing but what is the reſult of experience. We ſhall inform the owner what he may do for his cattle himſelf, and lay down ſuch plain rules for the conduct of the farriers, that he will be able to know whether they act according to reaſon and knowledge. If they will ſtudy in the ſame pages, we promiſe them, they will find only truth: we requeſt them to peruſe 'em carefully, not only for the farmers ſakes, but their own; and conſider the harſhneſs of what we have been obliged to ſay, as a juſt repreſentation of their need for better information: 'tis one of thoſe wounds that is neceſſary to be opened deep, in order to reach the cauſe; and they know theſe ſoon heal when proper methods are followed.

The horſe is the moſt valuable creature in the farmer's ſtock, both with reſpect to his price and uſe. The care of chuſing, managing, and breeding this animal, we have delivered in a preceding part; but, in this place, he claims a particular regard, both for the frequent diſorders to which he is liable, and the eaſy methods by which the greater part of them may be remedied, when they are rightly underſtood. We ſhall give directions for preparing the medicines uſeful on ordinary occaſions; and ſhall enter largely upon the worſt diſeaſes to which he is ſubject.

CHAP. I.

Of the glanders.

WE have taken for the firſt article of the diſeaſes of horſes, this which is the moſt important of them all, and, in general, the leaſt underſtood. Many have called it incurable; and indeed, according to the old practice, it muſt have been ſo: for if ever a horſe recovered under that management, nature muſt have performed the cure: it is impoſſible they ſhould have aſſiſted in it, who knew nothing of the ſeat or nature of the diſeaſe.

Of late years ſome perſons of ſkill have undertaken the cure of horſes; anatomy has been called in to aſſiſt in the operations; and diſſections have been made of morbid bodies of that animal, to ſhew the cauſe, ſituation, and nature of the diſeaſes. From this we have been made acquainted with the origin and true nature of the diſorders of theſe creatures, and thence we may proceed properly to the cure.

With reſpect to the glanders, this was more wanted than in any other diſorder; and it is very lately we have attained the knowledge. A farrier to the king of France's ſtables, his name Laſoſſe, made the diſcovery; and the royal academy of ſciences received and adopted it. This is the true road to knowledge; when the moſt honourable aſſemblies will receive and give their ſanction to truth, from every hand that offers it; and do honour to any one who can do ſervice to the publick.

CHAP. II.

Of the miſtaken notions concerning the glanders.

THE glanders is a running at the noſtrils of a horſe: firſt there is a whitiſh liquor diſcharged; afterwards, as the diſeaſe gathers ſtrength, a browniſh matter; and, laſt of all, a bloody water. All theſe are voided in very great quantities, ſo that the horſe is offenſive to the ſight, and the diſcharge waſtes him continually.

This diſeaſe has deſtroyed thouſands of horſes; very few have eſcaped that were once ſeized with it: not that the diſorder is incurable, but from a miſtake, concerning its nature, none knew how to go about to cure it.

The reader will be aſtoniſhed, that among ſo many conjectures as have been made about this diſeaſe, none came near the right cauſe; and that people ſhould ſearch in the remoteſt parts of the body for the ſeat of a diſorder, which was ſituated where it appeared.

The old authors ſuppoſed the diſorder to lie in the brain: they imagined that, at laſt, the brains themſelves run out through the noſtrils, and to that attributed the death of the creatures: miſtaken as ſuch an opinion was, theſe were nearer the place of the diſorder than many who followed.

The next conjecture was, that it lay in the back-bone; and that the diſcharge through the noſe proceeded from the marrow of that part. This was a received opinion many years among our farriers, and is ſo, in moſt places, to this day; from whence they call the diſorder, the mourning of the chine.

Later authors have ſuppoſed the diſeaſe to be in the liver; ſome in the lungs, ſome in the kidneys, and others in the ſpleen: and the glanders has been attempted to be cured by diuretics and deobſtruents.

Mr. Solleyſel adopts all theſe parts as poſſible ſeats of the diſorder; and traces the matter by way of the cæliac vein, up to the head, where he ſuppoſes it is lodged upon the parotid glands, and thence diſcharged through the noſtrils. This appeared ſo learned, that many thought it muſt be true: and on this was founded a practice for the cure, which, like the reſt, was as ineffectual as the ſyſtem was erroneous.

After this, the lungs were conſidered as the ſeat of the diſorder. Others attributed it to knots and ſwellings under the caul: the authors of the dictionary of Trevaux, adopt the former of theſe opinions; and the latter is found among the ſyſtems in our Mr. Chambers.

We have named theſe opinions, to tell the farmer they are erroneous. Experience, diſſections, and certain obſervations, have ſhewn they are falſe: let him therefore take care that he is not miſled by them, and that he place no dependance upon the methods of cure founded upon them. Internal medicines are uſeleſs. The horſe may have a bad ſtate of blood at that time, and this may render the cure difficult. In that caſe, the common ſweetners of the blood may be given at the time he is under cure; ſuch as brimſtone and antimony among his corn, but otherwiſe they are not wanted.

CHAP. III.

Of the real ſituation and cauſe of the glanders.

IT is plain from obſerving the nature and progreſs of the diſorder, that the cauſe of it does not lie either in the brain or the back-bone, the liver or the lungs, the ſpleen or the kidneys. The ſeat of the diſorder is where it appears; no part of the creature is affected but the noſtrils; and the diſeaſe really lies in the glands, which are ſituated in the thin ſkin that covers their inſide. When the glanders are only in one of the noſtrils, the gland or kernel, which lies near the jaw-bone on the ſame ſide, is to be ſwelled and inflamed, and not that on the other ſide; but as ſoon as both noſtrils run, then both theſe kernels are found to be ſwelled in the ſame manner.

This diſorder may naturally proceed from a cold, without the blood's being concerned in it; though it may happen, in other caſes, that the blood is bad at the ſame time, and then the diſeaſe will be more difficult to cure.

When theſe kernels are inflamed, the running at the noſe comes on, and this is the firſt and gentleſt ſtage of the diſorder. The horſe's holding down his head increaſes this running; and thus a diſorder is begun in a natural way, and continued by natural means, which is ſtrengthning itſelf, while the farriers are attempting its cure by drenches; not one of which can have the leaſt effect upon it, becauſe they are levelled at an imaginary cauſe.

The lungs and ſpleen, the liver and kidneys, have been examined by diſſection, in horſes that have died with the diſorder upon them, and they have been found all ſound: therefore it is plain they have no ſhare in the cauſe: it lies wholly in the parts where it appears. It may come from a ſimple cold in the horſe; and it may alſo be occaſioned by the matter of a diſeaſe falling upon that part; or may be rendered worſe by a bad ſtate of the blood. In theſe particular caſes, the method of cure is to be the ſame with allowances for a bad ſtate of the blood; as to the other caſe, it requires no particular conſideration; for though a diſorder of another kind may have been the cauſe of the glanders, by ſettling on that part, yet, when once ſettled there, it is the ſame as if the glanders had come in a natural way; and the ſame method will prove a remedy.

There is a thin ſkin which lines every part of the noſtrils of a horſe. In the noſe there is a partition going all along the inſide, which divides it into two parts, or the two noſtrils. This partition is covered with the ſkin we have named: it is thin, ſoft and tender; and in it there are many ſmall kernels.

Theſe ſeparate a ſoft moiſture for rendering the ſkin ſupple and ſenſible; and this is all they are to do in their natural ſtate; the abundance of their diſcharge being a trifling thing, and thrown off without offence: but theſe kernels will, by being diſordered, ſeparate a larger quantity of a fouler matter, and this is the glanders.

On each ſide of the partition which divides the two noſtrils, there are large cavities. The ſame ſkin which covers the partition itſelf, is alſo continued to them, and forms a covering to their bottoms and ſides; but in this part, the kernels are fewer and ſmaller than elſewhere, and they only ſeparate a very ſmall portion of the moiſture for keeping the ſkin there ſoft. This is a happy proviſion of nature; becauſe the loweſt and innermoſt parts of theſe hollows are ſo deep and winding, that if any redundance of the matter had been ſeparated there, it could not have been diſcharged as from the other parts; and nature would have been loaded and obſtructed by the remaining of it upon the place.

The ſkull of a horſe is compoſed of ſeveral parts; and in that piece which forms the forehead, juſt above the place of the eyes, there is a ſpace between the two plates of the bone: theſe make what are called the frontal ſinus's; but the farmer, without troubling himſelf with remembering ſuch names, will underſtand that there are ſuch hollows; and this will be enough for his purpoſe. Theſe are covered throughout on the inſide with the ſame ſkin, which covers the partition of the noſtrils; and it has in this part the ſame ſort of kernels. All this ſkin, and all the kernels in it, are the ſeat of the glanders. In the beginning, the kernels ſwell, and diſcharge a great deal too much matter; and theſe in the hollows of the forehead-bone moſt of all. They are therefore the main ſeat of the diſeaſe. When it becomes more violent, they are ulcerated or grow full of little ſores; then they diſcharge a more offenſive matter; and at length the whole ſkin of this part is enflamed, ſwelled, and eaten to pieces, and then comes the diſcharge of a bloody matter. This is no fancyful ſuppoſition, but is the exact and real fact found by examination.

When the head of a horſe, violently affected with the glanders, is opened, not only the kernels are found to be ſwelled and ſore, but all this ſkin is full of ulcers; and it is ſeen to be grown much thicker than naturally, and fuller of blood-veſſels; and theſe are eaten to pieces at their ends. From theſe flows the blood, and from the ulcerated glands the matter, which come from the noſtrils of the horſe in this diſorder.

We mentioned the natural hollows on each ſide of the partition of the noſtrils; and obſerved, that nature occaſions ſo little of the liquor of the kernels to be ſeparated here, that it ſerves only to moiſten the ſkin, becauſe if more were ſeparated there, it could not be diſcharged: This miſchief happens in the caſe of the glanders. The kernels there are diſordered like the reſt; they grow ulcerated, and they diſcharge a great deal of matter, which lodges in theſe hollows, and they are always found full of it in a very offenſive condition, on the diſſecting the heads of horſes dead with this diſeaſe.

In the ſame manner, the kernels which are in that part of the ſkin, which lines the ſides of the hollow in the forehead-bone, grow ſwelled, enlarged, enflamed, and ulcerated; and the ſkin itſelf becomes thick, raw, and bloody. All this joins to confirm the truth of that ſyſtem, which places the ſeat of the glanders in this ſkin, or lining of the noſtrils and its glands, and declares it not to be in the liver or elſewhere; becauſe in all diſſections of horſes dead with the glanders, this ſkin and its kernels are found thus inflamed and ulcerated, and the entrails are ſound and good; unleſs when the creature has had ſome other malady beſide.

Theſe hollows of the forehead-bone in horſes dead with the diſorder, are found alſo full of thick offenſive matter: and the change in the ſkin itſelf is greater here than in any other part. In a horſe that has died without the glanders, this ſkin is thin, fine and ſoft, and there is never ſeen in it any blood veſſel: but in a horſe dead with the glanders, the ſkin is thick, hard, and inflamed; and there are blood veſſels ſeen all over it, with their ſides and ends eaten to pieces. In each noſtril are two ſubſtances rolled up like horns, and in the ſame manner covered with the ſkin which covers the partition, and lines the cavities; and in theſe parts this ſkin is in the ſame manner enflamed, thickened, full of blood veſſels, and ulcerated. Therefore as the ſkin we have deſcribed is the real ſeat of the glanders, it is univerſally affected, and no part of it eſcapes.

The diſeaſe firſt ſhews itſelf in thoſe parts of this ſkin where the kernels are biggeſt, as in the hollows of the forehead-bone; ſo that they may be called in a particular manner the ſeat of the diſorder: but it afterwards purſues its courſe through the whole extent of that membrane.

It is in general much the ſame ſtructure we find upon diſſection in the head of a horſe, and in that of one of our own ſpecies: but there is a particular difference in thoſe glands or kernels we have mentioned under the jaw bone, which one by one ſwell, as the diſeaſe affects firſt one, and then the other noſtril. There are the ſame in men, and anatomiſts call them the ſublingual glands: but in men they open into the hollow of the mouth; ſo that whatever they diſcharge is managed as the ſpittle: but in horſes they do not open into the mouth, but turn backwards, and paſs behind the holes of the noſtrils.

The mouth in mankind is in a great degree moiſtened by theſe glands; and to ſupply that office in horſes, as theſe have their opening turned another way, there are innumerable ſmall kernels placed all over the inſides of the lips. Now though the kernels we have juſt named are ſwelled in the firſt appearance of the glanders, yet the others within the lips are not at all affected: the diſeaſe not being concerned with the mouth, but only with the glands of the ſkin of the noſtrils. It rarely ſpreads to any other part. In the extreme degrees of the diſeaſe, the partition of the noſtrils which is covered by this ſkin, will be eaten by the ſharpneſs of the humour; but no diſſection ever ſhewed any other bone to be affected.

If the liver, the lungs, or brain, were the ſeat of the diſeaſe, the creature muſt be pining in other reſpects; and ſooner or later would be carried off; whereas we ſee on the contrary, that this diſorder ſhews itſelf on horſes otherwiſe in perfect good condition; and that when it has rendered them unfit for better ſervices, and they are delivered over to hackney coachmen, they live a long time with it, and ſhew no ſign of any other diſtemper.

CHAP. IV.

Of the cauſes of the glanders.

THE glanders may ariſe from a common cold, and in this caſe the firſt approaches of the diſorder are to be guarded againſt, for they may be ſtopped, and that miſchief eaſily prevented, which it will be afterwards very difficult to cure.

When a horſe has a cold, and it falls upon his noſtrils, it will be ſeen by his ſnorting and frequently toſſing about his head, and afterwards by the noſtrils being more than ordinarily wet. If the horſe be in a feveriſh diſpoſition at the ſame time, the ſkin and its kernels will enflame as well as ſwell, and all the ſymptoms may very naturally follow.

If it ſeize upon the noſe, let the horſe be blooded largely: then give him twice in the day a good warm maſh, and ride him gently afterwards. Keep him warm and clean, and the next day give him the common purge.

If this do not anſwer let him be blooded the day after, as largely as at firſt, and purſue the ſame courſe one day more. This rarely fails.

I have practiſed this myſelf with the greateſt ſucceſs: I have all the reaſon in the world to believe I have prevented the glanders in many a horſe; and can ſay with the greateſt truth that I never had one, ſince I have followed this practice, that has fallen to that diſorder, which I reaſonably attribute to taking this care in time.

A cold ſeizing upon the noſe is not the only thing that may cauſe the glanders. A ſurfeit may take the ſame effect. This fouls the blood, and produces groſs humours in abundance; and theſe may naturally be diſcharged by the kernels in this ſkin: this may ſwell, inflame, and ulcerate the ſkin of the noſtrils, and be an immediate cauſe of the glanders; and in this way that diſeaſe will probably be more dangerous and more difficult of remedy. The method of cure muſt be the ſame, only with this caution, that ſweeteners of the blood muſt be given at the ſame time.

Before the farmer attempts to cure a horſe, he muſt be aſſured the diſorder is what he takes it to be: if he obſerve carefully the ſymptoms we have ſet down, he cannot be deceived; but he muſt not ſuppoſe every running at a horſe's noſe to be the glanders; for in that miſtake he may ſometimes ſet about a troubleſome and harſh method of cure, for a diſorder that would perhaps have gone off of itſelf, or with a ſingle bleeding: or he may, in ſome caſes, attempt to remedy that which is incurable; and diſgrace the method, becauſe it would not cure a different diſeaſe.

He is to obſerve the difference between a cold ſettling upon the noſtrils, and the glanders. We have ſhewn this may bring on the glanders, but it is not that diſeaſe itſelf, and ſlighter methods will cure it. An abſceſs in the lungs may diſcharge itſelf at the noſtrils of a horſe, and this, though it on a ſlight obſervation reſemble the glanders, yet is altogether diſtinct in its nature, origin, and ſituation; and therefore cannot be reached by the proper cure of that other diſeaſe.

Let the farmer obſerve the nature and colour of the matter. If this be ſharp, corroding, and ill-coloured, it looks like the glanders, therefore let him look into the inſide as far as he can; and if he perceive the ſkin ſwelled, inflamed, and full of little ſores, there is little room to doubt of its being this diſorder. Let him next obſerve whether it runs continually, which if it does is another proof; and laſtly, let him examine the horſe in other reſpects, and if he find him in every other circumſtance well and healthy, he may conclude with certainty this is the diſeaſe. If the matter be thick and white, and the inner part of the noſe not inflamed or ulcerated; and if it run very little while he is at reſt in the ſtable, and encreaſes on his being put to work; and finally, if he has a difficulty of breathing, and a rattling in his breaſt as he takes his breath, all theſe ſymptoms conſidered together, will ſhew that the diſeaſe is not the glanders; but an abſceſs in the lungs.

CHAP. V.

Of the method of cure for the glanders.

THE glanders is a collection of ulcers in the ſkin of the inſide of the noſe, and its glands: knowing this we may advance rationally to the cure. The method muſt be by cleanſing and freeing the parts from the lodgment of this ſharp matter, and healing of theſe ulcers. That might be done in the ſame manner as external ſores are cleanſed and healed, but the difficulty is to come at theſe: for there is no way of getting freely and properly at the complaint: therefore the firſt thing is to make an opening to the place where nature has not given any. We know the principal ſeat of the diſeaſe is within the cavity of the forehead bone, and we are to proceed accordingly.

When the ſkull is beat in by a fall in our own ſpecies, the ſurgeon cuts a hole through it in another place, that he may have way to come at the depreſſed part within. This operation is very terrible, but very ſafe: it is practiſed continually, and with ſucceſs. What we are ourſelves able to endure, certainly this coarſer creature may. On this has been founded the only rational method ever laid down for the cure of the glanders.

A hole is to be pierced through the ſkull of a horſe, in ſuch a place as is leaſt liable to inconvenience, and moſt properly ſituated for the throwing in proper liquors to the ſeat of the diſorder. The firſt conſideration is, whether the glanders be ſeated only in one noſtril, or whether it have ſeized on both: if only one be affected, then one ſuch opening through the ſkull will be enough: if both be infected, two ſuch openings are to be made, one for each.

The place for this opening is, on one ſide or both ſides the head. It may be done without the leaſt inconvenience or hurt to the creature, and it will give a free paſſage to the neceſſary applications. The beſt place is at ſome diſtance below the eye. In performing this on the human ſpecies, if any bad conſequences ever attend it, they are not owing to the cutting a hole through the bone, but to the injudicious hand of the operator hurting the brain in doing it. Now in horſes the brain does not come ſo low as to the eyes; and therefore in making two holes, or more if neceſſary lower down, there is not the leaſt danger.

The ſafety of this operation being thus ſhewn, the uſe of it is evident. The proper liquors for waſhing and cleaning of the parts, are to be thrown in at theſe openings by a ſyringe; and the holes are to be ſo made that the ſyringe being pointed upwards, the hollow in the forehead bone, which we have ſhewn to be the great ſeat of the diſeaſe, may be thoroughly waſhed by it. It were very much to be wiſhed, that the opening could be made juſt where this hollow of the forehead bone is; but that lies ſo high that a farrier might do miſchief. The brain is ſituated there, for the part is conſiderably above the eyes, and more toward the middle of the head, but it will anſwer every good purpoſe of this method if the opening be made lower, and the liquor thrown up into it. In this method one hole may be made to anſwer the purpoſe in moſt caſes, though there will not be the leaſt diſadvantage in making two or more for better convenience.

Though the cavity or hollow in the forehead bone lies higheſt; yet the hollows at the ſides of the partition of the noſtrils are the moſt difficult to be well cleaned. Upon two principles alone turns the whole method of cure in this caſe; the firſt is, that there be a way by which the liquor intended for waſhing and cleanſing the parts can be conveyed to them through a ſyringe; and the other, that when the matter is thus waſhed off from the ſkin and its kernels, there be a paſſage for the liquor and that foul matter to go off freely together.

In reſpect of the matter lodged in the hollow of the forehead bone, that being waſhed away by the liquor from the ſyringe will freely and naturally diſcharge itſelf, together with the liquor, out at the noſtrils; but it is not ſo in the natural ſtate of things, with reſpect to the matter which fouls the inſide of the hollows ſituated at the ſides of the partitions of the noſe; for we have ſhewn already that they are ſo deep and crooked, that there is no way of getting any thing once lodged there, out of their bottoms, by the natural paſſages.

This incurs the neceſſity of another opening in the bone, but as this muſt be much lower than the other, there can be no poſſible danger in making it. All below the eyes in a horſe's head ſhould be conſidered as the bone of the noſe, not the ſkull; we underſtand by ſkull the covering of the brain, and there is no brain within or near that part. An opening in this place is altogether neceſſary, and not at all dangerous. It would be in vain to waſh off the matter in theſe cavities ever ſo clean, if, when that were done, a part of it muſt of neceſſity be left in the cavity, together with ſome of the liquor of the ſyringe; but this is eaſily to be diſcharged in this manner. The beſt place for making the opening to waſh and clean theſe cavities, is to pierce through the bony diviſions; and then to open another hole ſomewhat lower, to give paſſage for all that is waſhed out.

The beſt direction for the exact place of theſe holes is, that the farmer and the farrier together examine the ſkull of a dead horſe. They will ſee how theſe ſeveral cavities are placed, and by that know better than by any formal directions of words or figures, where to make them. When the holes are opened, and the ſyringe is uſed, the proper method is to throw in the liquor briſkly, and then to ſtop the noſtril, that it may be forced out at this hole: by this means all will be perfectly cleared; and by a repetition of this cleanſing, and an injection of proper liquors, the diſeaſe will be thoroughly cured. This reduces the glanders to the condition of an outward malady, and it is thus to be remedied in the ſame manner.

In caſe of the matter, together with the injection, not coming freely and perfectly out at the lower opening, nothing more is needful than to make way for it by thruſting in the point of any ſharp iron inſtrument. It frequently happens that the bones have a particular conſtruction in this part; but when they have it is attended with no farther difficulty. This conformation may ſtop in the matter, or a part of it, but the opening thus made never fails to diſcharge it. If the opening made by the point of the inſtrument, ſhould cloſe up before the time, it may be kept open by burning it with a red hot iron.

This method of cure was propoſed in France, and there was very well received; there is no queſtion of its ſucceſs wherever it ſhall be introduced. We have ſhewn the whole deſign and nature of the operation, and ſhall in the next chapter treat of the beſt methods of preparing the liquors for injecting.

CHAP. VI.

Of the liquors to be injected for a cure of the glanders.

PROPER liquors for performing the cure are of three kinds; the firſt cleanſing alone, the ſecond cleanſing and healing, and the third ſtyptick.

For the firſt liquor, ſet on three gallons of water to boil, and have ready three pounds of fine ſtone lime new made. When the water boils pour it into a pan, large enough to hold three times the quantity, and by degrees put in the lime. There will be a great ſwelling and boiling up, and when all is over, and the whole is thoroughly cold, the water will ſwim clear and tranſparent at the top, and the lime will be ſettled in a white powder at the bottom. Pour off the liquor, and ſet it by all night: in the morning there will be a ſkin upon it; ſcum this off and bottle up the clear water. This is lime water of an exact degree of ſtrength for the intended purpoſe. Let the farmer be ſure not to buy it, but to make it himſelf. To a quart of this lime water put a quarter of a pint of vinegar, and half an ounce of baſket ſalt, let it all melt together, and then it will be fit for uſe.

Two openings being made in the head of the horſe, let a pewter ſyringe be got, that will hold half a pint. Set on the liquor juſt named, to warm; and when it is of ſuch heat that the hand can be bore in it ever ſo long without pain, it is fit for uſe. Hold the noſtrils of the horſe together, and drive in this liquor carefully and forcibly. It will run out partly at the lower hole, and partly at the noſtrils, when they are let open; as they ſhould be at a proper time, when the greateſt part of the liquor has gone the other way. When this ſyringefull has been uſed, heat as much more, and throw it up in the like way. Then let the horſe reſt twelve hours, after which repeat the ſame method. Morning and night are the beſt times of doing it; and this is to be continued four days, but with the uſe of the ſecond liquor in the middle, and at the end of that time.

The ſecond liquor is thus prepared. Set a fire ſhovel over a very gentle fire, and put into it a quarter of an ounce of green copperas beat to powder: ſtir it about till it becomes a dry grey duſt. Put this into two quarts of molaſſes ſpirit; and add a little ſcrapings of oak galls. Shake this up and ſet it by all night. In the morning it will be black like ink, and this is a cheap and eaſy way of preparing the famous ſtyptick of Helvetius.

Upon the ſecond day uſe the water with the ſyringe, at four o'clock in the afternoon, inſtead of late in the evening; and, towards night, warm half a pint of this black tincture. Throw this up with the ſyringe in the ſame manner as the other; and leave the horſe to his reſt. The ſame do on the evening of the fourth day, and then prepare the third liquor.

Powder a quarter of a pound of allum, and add to it the ſame quantity of white vitriol. Put them into a ſtrong earthen pipkin, without any water, and ſet them over the fire; they will melt and afterwards dry again. Then take them off, grind the whole to powder, and put it into a large jar: pour upon it a gallon of the lime-water, ſtir them well with a ſtick, and leave it all night. In the morning pour off the clear liquor, leaving the ſettlement behind; add to it a quart of ſtrong vinegar, and bottle it for uſe.

This is to be the liquor for injecting, after the four firſt days. Every morning and evening warm a pint of this, and carefully throw it up by the ſyringe, obſerving to ſtop the noſtrils at firſt, that the greateſt part of the liquor may each time run out thro' the lower hole in the face: then let ſome of it come laſt of all through the noſtrils; by this means, every part will be waſhed and cleanſed twice a day by this excellent liquor; and, by degrees, the whole will heal. Every other day, the laſt injection of the water muſt be performed in the afternoon, as directed in the preceding article; and at night each of thoſe days, the black tincture is to be injected.

This is a plain, rational, and ſafe method of proceeding; and by this means the glanders will be perfectly cured, at a very ſmall expence, and with no great trouble. Many ſerviceable horſes will be preſerved from the dogs, or from the meaneſt employments, and rendered as valuable as if the diſeaſe had never attacked them.

The time required to perfect a cure, will be different, according to the degeee of the diſorder; but, in general, it may be called three weeks or a month; the progreſs of the cure will be ſeen by the ſtopping of the running; and it will always be adviſeable to continue the injections a fortnight after the cure ſeems perfect, every other or every third day. If the fleſh grow faſt about the openings, it muſt be kept down by a hot iron; for there muſt be preſerved all the time a free paſſage for the liquor both in and out; and if the horſe be otherwiſe diſordered, brimſtone and antimony are to be mixed and ſprinkled over his provender.

CHAP. VII.

Of purging a horſe.

THERE are many occaſions on which a horſe may want purging, and many ſorts of phyſic anſwer the purpoſe; but before we come to the method of preparing theſe, it will be neceſſary to give the farmer proper directions concerning the uſe of them. A horſe muſt be prepared for a purge the day before it is given, or it will take very little effect; and then it will operate more or leſs, according to the management of him during the time.

The day before a horſe is to be purged, give him a good quantity of water with ſcalded bran in it, warm. Keep him quiet, and the next morning, before he has any thing to eat, give him the purge. Either of the following will anſwer the common purpoſes, with little charge.

1. *A purge with aloes.*

Take an ounce and a quarter of horſe-aloes beaten to powder, and a quarter of an ounce of cream of tartar, mix theſe up with an ounce and a half of freſh butter, and half an ounce of powder of anniſeeds, work this up into a conſiſtence, and roll it round into two balls. Rub theſe over with butter, and give them to the horſe; they will ſlip down freely; and after them give him a horn of ſmall beer made warm. The doſe is to be made larger or ſmaller, as the horſe is larger and coarſer fed, or finer, and managed more delicately. There is as much difference between the conſtitution of a cart-horſe and a racer, as between a drayman and a perſon of quality; and they muſt in all reſpects be treated accordingly, not only in the ſtrength of the doſe, but in the management afterwards: for what ſuits one will be quite improper for the other.

2. *A purge with jalap.*

Take powder of aloes an ounce, powder of jalap a quarter of an ounce, and powdered ginger a dram: mix theſe up with two ounces of freſh butter, and make the whole into a couple of balls: greaſe them on the outſide, and give them to the horſe with ſome warm ale afterwards. Theſe are two common receipts, but they are often ill proportioned in the quantities; ſomething of this kind ſtands under the name of a purge for horſes in moſt books that treat of theſe things; but the quantity of the anniſeeds is too great, in the common directions for the firſt; and this will make a horſe ſick afterwards; and to the other there are commonly added uſeleſs ingredients. Theſe are approved proportions, and they will anſwer almoſt every occaſion there can be for a horſe's being phyſicked in this way.

CHAP. VIII.

Of managing a horſe with his phyſick.

LET the balls and the beer be given early in the morning, and let the horſe be rid out gently for a quarter of an hour. Then bring him cool in, and let him be ſet up two hours without food. After this give him a ſmall quantity of good hay, and a quarter of an hour after ſome warm water. An hour after this give him ſome ſcalded bran. He will purge kindly, and after this he ſhould be rid out a little again; then when he is brought in, he ſhould have ſome bran and water warm, with but a ſmall quantity of the water. Then let him be rid out again. It will be eaſy to make it work more or leſs, by giving him more or leſs exerciſe, and more or leſs of the bran and water.

If the purge have been too violent, and will not ſtop, the following aſtringent drink will ſtop it.

An aſtringent drink.

Boil three pints of ſtale beer, and ſome pieces of cruſt of brown bread: to this put an ounce of whiting, and a quarter of an ounce of diaſcordium, made without honey: if this does not ſtop it, in four or five hours, give the ſame quantity of whiting, and double the quantity of diaſcordium, in only one pint of the beer and bread. This will make him altogether quiet and eaſy; and he will be in his body as uſual.

CHAP. IX.

The care of a horſe in taking him up from graſs.

IT is generally proper to purge a horſe when taken up from graſs; but this muſt not be done immediately on taking up; he ought to be kept in the ſtable a week, and he ſhould have ſcalded bran twice before the purge. There muſt be a great deal of care taken of a horſe, in general, in the taking him up from graſs, otherwiſe he will fall into diſorders very difficult to cure. He muſt be dry when taken from the paſture, otherwiſe he will very likely grow ſcabby.

Bartholomew-tide is the lateſt he ſhould be left out, if of a tender make; for after this time he will have more cold and leſs nouriſhment. Dews are nipping after this ſeaſon, and the graſs has loſt its ſtrength; ſo that partly for want of nouriſhment, and partly for the chilling of his blood, it is much if he eſcape ſome diſorder.

It is a good method with a delicate horſe, to trim him as ſoon as he is taken from graſs. He is to be led out in a fine warm day, and when he is trim'd, ſome ſoap and a good quantity of warm water is to be got ready. He is to be rubbed over with the ſoap, taking care it does not get into his eyes or ears, and then waſhed with the warm water and ſome flannel-cloths: this is to be done twice over, and he is then to be led into the ſtable, and gently rubbed with a cloth till dry. He is then to be kept a week or more in the ſtable, and then purged and blooded. This courſe naturally and perfectly reconciles him to the new method of living, and he falls into no diſorder.

CHAP. X.

For a cold.

THIS is a diſorder ſo well underſtood, that it cannot be miſtaken, nor does it need any explanation. Boil in a quart of ale three ounces of freſh liquorice root, beat very fine into threads. Strain the liquor off, preſſing it hard, and add to it three drams of elecampane powder, one dram of powder of anniſeeds, a quarter of a pint of oil, and a quarter of a pound of honey; mix all, and give it warm. If it does not take effect the firſt time, let it be repeated three or four times.

Balls for a cold of long ſtanding.

Put into a large bowl ſix pounds of wheat meal, mix with it two ounces of powder of anniſeeds, cummin ſeed one ounce, linſeed three ounces, fenugreek-ſeed one ounce and a half; ſtir theſe well about, then mix half a pound of liquorice powder, and a quarter of a pound of flour of brimſtone, add theſe to the reſt. Laſtly, add bay-berries and juniper-berries, powdered, three ounces of each, and the ſame quantity of powder of elecampane. When all are well ſtirred and mixed together, break ſix eggs, throw away the whites, beat up the yolks with two quarts of mountain wine. Add to this a pound and a half of honey and a pint of ſallad oil. Mix all theſe perfectly well together; then bring in the powder, and work the whole to a paſte. If this ſhould be too ſtiff, a little more wine muſt be added; and, if too ſoft, ſome flour muſt be put in, till the whole is of ſuch a conſiſtence that it will conveniently roll into balls.

Theſe are to be made of the bigneſs of a hen's egg, but round. This rolling them up is only for the convenience of keeping; when they are to be uſed they are to be diſſolved. Two is the proper quantity for a doſe, and they are to be melted in water, and given morning and evening, for fifteen days.

CHAP. XI.

For the ſleeping evil.

THE ſleeping evil in horſes is what we call the lethargy in our own ſpecies, and it will be as fatal to them as it is to ourſelves, if not remedied in time. The cauſe is their eating a great quantity of coarſe food, and having leſs work than uſual. It ſhews itſelf by their being ſluggiſh, and continually dozing: the remedy is the following ball.

Pound in a marble mortar a handful of the plant called wall-pepper, or ſharp ſtone-crop; it is a common creeping plant upon walls, and bears yellow flowers. Put to this a very little white wine, and ſqueeze out the juice. Grind in a mortar four ounces of elecampane powder, and one dram of powder of pellitory of Spain; add the juice to theſe, and then put in a quarter of a pound of Caſtile ſoap, work and beat all well together. Then put in liquorice powder by a little at a time, enough to bring it to a ſoft paſte. Keep this in a pot, and every morning before the horſe has taken any food, give him a piece of it as big as a large walnut, greaſed. Let him drink milk and water, warmed, after it, and keep him ſtirring. This is a receipt I have ſeen try'd many times, and never once found it fail to make a perfect cure.

CHAP. XII.

For the gargle.

THIS is a diſorder that principally affects the head and throat of the horſe, and, if not taken in time, is very dangerous. It is alſo unfortunate in another reſpect, for it is contagious; and, from one horſe will ſpread itſelf through a whole ſtable. It is moſt dangerous in autumn, and generally attends dry ſeaſons, when there being a ſcarcity of water, the horſes are forced to drink what is foul and bad.

I have alſo known it plainly cauſed by horſes feeding upon a poor bad graſs in wet places; where there generally lies water over the ground; but it happens to be dry at theſe ſeaſons. Some horſes are fond of this filthy food: I have obſerved their chops all dirted with eating it down to the ſtumps; and generally the gargle has followed.

A horſe that has the gargle hangs down his head, and is reſtleſs: he breathes with difficulty: his eyes are gummy, and his head ſwells; he rattles in the throat, and he goes weakly and ſtaggering. As ſoon as the farmer ſees this diſorder, let him ſeparate the creature from the reſt; and bleed them all by way of prevention. Then bleeding the ſick horſe more largely than the others, give him the following drench.

Set on two quarts of ale to boil, and as it heats ſtir in a dram of ſaffron cut ſmall, and half an ounce of Philonium Romanum. Bruiſe two heads of garlick and two good handfuls of wormwood, preſs out the juice, and pour this to the reſt; let it boil a little, and then ſet ſet it off. This is for two doſes; if the horſe be very bad, he may have one in the morning, and another at night; if not, one at night only will do, keeping him three hours without food before, and giving him nothing after it.

Let this be repeated every day, or every other day, according to the degree of the diſorder, for four times, and let him all the while be kept warm, and give him boiled oats and ground malt in a maſh.

CHAP. XIII.

For roughneſs of the coat and ſwelling of the heels.

WHEN a horſe grows rough in a ſtable, and his heels ſwell, the following mixture is to be given him with all his food. Take a pound of flour of brimſtone, half a pound of turmerick, and a quarter of a pound of crude antimony in powder. Sift theſe together; by which means they will be thoroughly mixed, and ſtrew a little of it among all his victuals.

CHAP. XIV.

For a ravenous appetite.

THERE is a diſorder in our own ſpecies called a canine appetite, in which the perſon is greedy, and devours every thing, with no advantage to the body. Horſes are ſubject to the ſame, and they will conſume more than their due quantity of food, and ſtill be poor and lean. They ſwallow their meat without chewing it. It is much more common than it is thought; and we adviſe all who are concerned with horſes to regard it. They may know it by watching the horſe's manner of eating, and by obſerving his ſtools. If he ſnatches at every thing, and eats greedily and quick, it is a ſuſpicious circumſtance: and if his food be ſeen entire and unaltered in his dung, it is a proof. When horſes have this ravenous appetite to a great degree, their provender will go through them unaltered, and they will grow poor and weak till they are uſeleſs. In this caſe give the following drench.

Mix a gallon of milk and a quart of oil: ſtir in as much raw wheat flour as will mix in without making it too thick for ſwallowing eaſily. Give him a good drench of this every morning, and about half an hour after offer him ſome hay. Give him but a moderate quantity, and then let him be quiet. When he has been rode out a little, or worked for ſome hours, give him ſome more hay. He will ſnatch at it and be ravenous as uſual; but let him have only a little at a time, and let him ſee no more. Feed him to the fill by a little at a time, till he will not eat any more; then ſet a good quantity before him, but don't let it remain a great while in his ſight. Repeat this every day for a week, and he will eat like other horſes.

CHAP. XV.

For the ſtaggers.

THIS has been fatal to many a ſtout creature. The principal cauſe is the careleſſneſs of ſervants, in turning a horſe out to graſs, while he is hot from labour. This gives him a violent cold, which loads his head with a tough phlegm.

A horſe is known to have the ſtaggers by his tottering, ſtaggering, and going weakly and faintly. His eyes will be wateriſh, and at firſt he will thruſt his head into the litter, and by toſſing it up and down ſhew his great uneaſineſs: in the more violent ſtate of the diſeaſe he will beat his head againſt the wall in his agony.

This diſeaſe ſhould be watched in the beginning; for it is then much eaſier cured than afterwards. The firſt thing is to bleed him largely. If the diſorder be perceived in time, a good bleeding alone is often a cure. Some adviſe bleeding in the flank, but it is of no conſequence from what part, except in the head itſelf; which, if the firſt bleeding do not ſucceed, may be very well done during the uſe of the other remedies.

A natural bleeding at the noſe often carries off diſorders of the head in ourſelves almoſt immediately. The ſailors have a way of bleeding themſelves in violent head-achs between the griſtles at the end of the noſe: and Dr. Dover tried to bring in the cuſtom of bleeding in the ſame part more artfully. I have known it done ſometimes, and always with ſucceſs; but neither the ſurgeons nor the patients liked it, ſo it preſently dropped. The good accruing from this bleeding, though in never ſo ſmall a quantity, ſhews what may be done for a horſe in this terrible diſorder the ſame way. The country farriers method is a very coarſe one, but I have ſeen great good ariſe from it.

They ſharpen a tough ſmall oak ſtick, and ſplit it at the end like a fork. They thruſt this up the horſes noſtrils, and ſet them to bleeding; and this is very ſucceſsful. It may be done after two days, if the following medicines do not take effect.

Two hours after the common bleeding give the following glyſter. Heat two quarts of emetick wine, and diſſolve in it a quarter of a pound of Unguentum Populneum: throw up this as a glyſter, and let him reſt. Mean time prepare the following medicine: boil together two ounces of powder of the ſcoria of liver of antimony and five pints of ſtrong beer. When it has boiled five minutes take it off the fire: diſſolve in it a quarter of a pound of butter. An hour after the firſt glyſter has come away give this in the ſame manner, and then walk him gently out in a warm dry place. Rub his legs well with wet whiſps of ſtraw, and feed him with bran and bread, and warm water.

Two hours after the ſecond glyſter has come away, diſſolve an ounce of venice treacle in a pint of white wine, and give it to him as a drench: and preſently after give another glyſter thus made.

Boil a double handful of mallows, roots and all in two quarts of ſpring water to a quart; add to this when ſtrained off two ounces of ſal polycreſtum, the ſame quantity of venice treacle, and three quarters of a pint of oil: give this warm, and ſet him up for reſt.

The next day let one or other of theſe glyſters be repeated as occaſion may require; and put into his ears ſome pounded rue, black hellebore root and pepper mixed up with brandy. Sow up his ears to keep this in, and let it remain there all day. Then give the following drink. Boil in two quarts of ale two ounces of turmerick, and the ſame quantity of anniſeeds in powder; add to the ſtrained liquor a quarter of a pint of brandy, and give it for a drench.

The diſorder is a very ſevere one; ſo that it commonly ſoon terminates either in the death or recovery from the immediate danger: but ſometimes, though he get ſoon out of danger, he recovers ſlowly. In this caſe the glyſter need not be repeated, but he ſhould continue in a courſe of the drench for ſome time, and be kept carefully warm and well rubbed.

There is another famous remedy which often aſſiſts greatly; and ſometimes ſucceeds by itſelf: it is this: dig up a dock root and quarter it; cut a ſlip of the thickneſs of half a finger, and an inch long: then ſpread a plaiſter of common pitch of half the breadth of the palm of the hand: theſe being in readineſs, cut a ſlit through the ſkin to the bone in the middle of the horſe's forehead: lay in the piece of dock-root, and cover it with the plaiſter.

If it runs in twelve hours, the horſe will be likely to recover; if not, the caſe is deſperate.

CHAP. XVI.

For the farcy.

THE farcy is the moſt loathſome diſeaſe that can be conceived: it is a creeping ulcer, that ſpreads and runs in an offenſive manner; and is not eaſily remedied, when got to any height.

The firſt appearance of it is in hard knobs and lumps; and theſe ſpread till they over-run the greateſt part of the body. It is owing to a diſordered ſtate of the blood from bad food and unreaſonable fatigues; and when a horſe is in a condition to receive the diſeaſe, it will be catched by ſtanding near one that has it; or the ſpurring with a ruſty ſpur; the wounding the mouth with the bridle, the galling with the belt, or any other hurt will bring it on.

Often a horſe will itch ſo in ſome part with the foulneſs of his blood, that he will rub till he breaks the ſkin, and the diſorder ſhall begin that way, and ſpread quickly. The fattening up a horſe haſtily, and taking him from a laborious life to a quiet ſtable will ſometimes bring it on. I have ſeen this error frequently: a farmer deſigning to part with a horſe, has taken him up to fatten in a hurry; and inſtead of anſwering his purpoſe, has given him this diſorder. It is to be cured eaſily when taken in time; but the generality of the country people don't perceive the diſeaſe till it is at the height. I ſaw a neighbour James Barnes's horſe in 1738 cured perfectly, when it was taken in time, in about a fortnight; and it was done thus. Firſt the horſe was blooded largely in the neck; then the whole body was carefully looked over, and ſeveral of the knobs were found in different parts, beſide two or three that were burſt.

A liquor was thus made to rub them. Take half a pound of wood-ſoot, and the ſame quantity of ſoap-lees, boil them up together; put in two ounces of allum, and an ounce of verdigreaſe, and a little water, and ſtir all well together; then put in a dram of powder of euphorbium, and four ounces of powder of white hellebore root: let the whole boil up together, and then pour it into a jar. With this the horſe was rubbed in all the places where the diſeaſe appeared: and at the ſame time a good deal of flour of brimſtone was given him in his food. The cure was perfected, and the diſeaſe never returned.

Another method is to anoint the places with ratſbane mixed up with butter; and at the ſame time to give the following drench. Take a handful of the inner bark of the elder, the ſame quantity of the inner bark of the walnut tree, and the ſame of berberry bark; cut theſe ſmall, and put them into two quarts of ſtrong beer: let them boil a conſiderable time. Near the end of the boiling throw in a handful of wall pepper ſhred fine. When it has boiled up once or twice with this, ſtrain off the liquor. Put to the ſtrained liquor a quarter of an ounce of grains of paradiſe, and an ounce of powder of turmerick, and give it for one doſe. This muſt be repeated every day as long as the outward remedy is uſed; and give moderate exerciſe and moderate food.

When the diſeaſe is in its worſt ſtate, the ſores will not give way to any of theſe applications. They muſt be burnt with a hot iron, and then the ſame courſe followed that has been directed already: for the ſame remedies that would take no effect before, will anſwer the purpoſe after the effect of the hot iron.

CHAP. XVII.

Of the malanders.

THIS is another external diſorder of a horſe very painful and troubleſome, and very difficult of cure; ſome ſay nothing more is to be attempted than to alleviate the pain; and that it is dangerous to ſtop the diſtemper.

This is an error; for there is no degree of the malanders but may be cured with ſafety. This diſeaſe ſhews itſelf on the fore legs, upon the inner part juſt againſt the bending of the knee. It is not a knob or ulcer like the farcy, but a hard, dry, flat ſcab, of which ſometimes there is only one great one, ſometimes ſeveral ſmaller: theſe are cracked and chopped, and have ſtiff hairs growing upon them.

This is the whole of the diſorder: it ſometimes is very violent and inveterate, ſometimes more ſlight. When it is very bad it makes the horſe halt; and when leaſt it occaſions him to go ſtiff till warmed with exerciſe.

The general cauſe is bad management. It is the common diſorder of horſes kept in a ſlovenly manner, and much more rarely affects thoſe which are managed carefully. Thoſe horſes are moſt ſubject to it which have a great deal of hair upon their legs; and they are the moſt difficult to cure.

Sometimes the malander is only a ſoreneſs in the part, while the horſe is otherwiſe in health; ſometimes the blood is bad, and in this caſe the diſorder is more violent and more difficult to be cured. When the malander is only the effect of careleſſneſs, and 'tis upon a horſe otherwiſe healthful, the method is this:

Let him be kept to his uſual work and food: ſet on a ſaucepan with three quarts of water, put to it half a pound of fenugreek ſeed bruiſed, and a pound of freſh marſh mallow root cut in ſlices. Boil this till it is like a jelly, ſtrain it off hot, and preſs it hard out, then add to the thick liquor half a pound of opodeldock ointment. Make ſome of this hot morning and night, and dipping flannels in it, wrap them round the leg where the complaint is, as hot as the hand can bear to touch them. Let this be ſeveral times repeated; and, at the laſt of all, wet ſome of the ingredients, which muſt be ſaved when the liquor has been preſſed out, with the liquor hot, and lay them upon one flannel, cover them with another, and wrap the whole round each leg, tying it ſo as to keep it on, but not tight. Let this be done every day twice, till the hard ſubſtances begin to ſoften; after this once in four and twenty hours will do; and there will thus be a perfect cure.

Before the firſt dreſſing let the hair be clipped round about the place, and the whole part about the malanders waſhed clean with warm ſoap ſuds. Let this be repeated at times during the cure; and after it is perfected, let the legs be kept very clean in this part, for fear of its returning. In this manner a horſe will be cured very eaſily, that has no taint in his blood: but if there be, care muſt be taken, by giving inward medicines at the ſame time.

When this is the caſe the owner will perceive it by his habit of body; and by the outward remedy not taking its deſired and natural effect, he is then to proceed thus.

Let a pound of crude antimony in powder be mixed with four pounds of flour of brimſtone; and let ſome of this be ſprinkled among all his food. This is better in ſuch a caſe, than giving it in balls or drenches, for he takes it with his nouriſhment a little at a time, and often; and accompanying the food in its paſſage through the inteſtines, its virtue goes into the blood, together with the nutritive part of the food.

I have heard many who ſhould know ſomething better than the vulgar, ſay, that they would not cure a horſe of the malanders if they could, for that all that is prudent is to keep him from growing lame with them. They have an old proverb, that curing the malanders is ſhutting up the wolf in the ſheep cot. But they may be ſure there will be no danger or damage in curing any outward diſorder, when the blood is at the ſame time rectified within.

CHAP. XVIII.

For over-wearineſs.

WHEN a horſe has been inconſiderately rode or worked; and no right care taken to recruit nature by food or reſt, he will be poor, diſpirited, and ill looking; and in wrong hands may be utterly loſt. He will not eat, or not enough; or his food will do him little ſervice. Recourſe muſt be had to medicines, before he will have any real benefit from his provender. Mix in half a pint of white wine half an ounce of venice treacle, and half a dram of powder of ſaffron; give him this every night for four times. It will warm and ſtrengthen nature in every part; he will recruit in ſtrength and ſpirit during the night, and riſing in the morning from a good reſt, he will eat freely and heartily. He muſt have choice food, clean water, and gentle exerciſe, and leſs than a week will recover him.

CHAP. XIX.

For inward heat.

IT may always be perceived that a horſe is out of order by his uneaſineſs. If he be reſtleſs and faint, and, upon putting a hand in his mouth, his breath is found hot, and his palate and tongue inflamed, give him the following. Mix together a pint of new milk, two ounces of honey, three ounces of ſweet oil, and half a ſcruple of ſalt prunella. Give him this every morning, and keep him an hour after without food, repeat it till he is recovered. Three doſes uſually perfect the cure, if not he may take more.

C H A P. XX.

For a ſcurfy ſkin.

ALL creatures are liable to foulneſs of the ſkin, when they are not taken good care of: this is ſometimes attended with other diſorders, ſometimes not. When there is no other complaint joined with it, the remedies are to be only external.

Make ſome very ſtrong ſoap ſuds, and put in ſome vinegar, and powder of white hellebore. Firſt clean the horſe well dry; then rub him all over with a bruſh, wet with the ſoap ſuds, and then waſh him all over with the ſame, by throwing ſome over him, working it in with the hands and rubbing him with a coarſe cloath. After this let him be taken in and dried thoroughly, and give him ſome good food and clean litter.

Mix up a pound of flour of brimſtone, a quarter of a pint of oil of turpentine, and as much hog's lard as will make the whole into an ointment. Rub him well with this an hour after he is thoroughly dry from the waſhing. The next day boil a quarter of a pound of white hellebore, and a pound of dock root, in a gallon and half of water. Make this into ſuds, by beating it up with a good quantity of ſoap, and waſh him with it. Then anoint him well with the ſame ointment as before. Repeat this every day for ſeven, eight, or nine days, according to the nature of the complaint, and he will be cured: laſt of all waſh him well with the ſuds, without anointing him after it.

When the complaint has proceeded from bad food, bad water, and ill management, as well as uncleanlineſs, the ſame outward method is to be uſed; and he is to have flour of brimſtone and powder of antimony inwardly in his food.

C H A P. XXI.

For ſore heels.

SET on an earthen pipkin, with a quart of freſh urine. Put to this an ounce of roman vitriol, and four ounces of green copperas, let theſe melt, and then put in the gall of an ox, and a quarter of an ounce of oil of vitriol. Rub the ſore part gently with this every morning and night till it is well. When well waſh it very clean with ſoap ſuds, and keep it clean from time to time for fear of a return.

If there be a great running from the part after the firſt two days, put in a quarter of a pound of allum to the liquor.

CHAP. XXII.

For a cold caught at graſs.

THIS is not dangerous in itſelf, but ill management may bring it to be fixed, and to have the worſt conſequences. Timely care ſoon remedies it; and the proper courſe is this. Set on a pipkin with a pint of ale, and half an ounce of ſpaniſh liquorice. Stir it about, and when the liquorice is diſſolved take the horſe up, and give it to him early in the morning: ride him half an hour ſoftly after this; and then turn him out. Repeat this every day till he is cured, which is generally in a week.

CHAP. XXIII.

For the cholick.

HOrſes which are kept with great care are leſs ſubject to the cholick than others; but none are exempt from it entirely: it is a common complaint in the farmer's ſtable; and when not properly managed will be attended with bad conſequences. The moſt uſual cauſe of this diſorder is coarſe green food: let the farmer therefore when he perceives this diſeaſe coming on, change the food of the horſe; and give him ſome warm bran and water, with a few drops of oil of juniper.

Often this proves a perfect remedy; but when it does not, give him the following glyſter. Boil two handfuls of mallow leaves, ſtalks, and roots together in three quarts of water, to two quarts, then ſtrain it off. Set on the clear liquor again, with a quarter of a pound of caraway ſeeds; and a quarter of a pound of brown ſugar, let it boil up two or three times, then ſtrain it off, and add to it a quarter of a pint of ſweet oil, and a ſpoonful of oil of turpentine. Let this be given as a glyſter, and walk him after it. Two hours after this is come away give him three drams of philonium romanum, diſſolved in a pint of warm water, as a drench.

If it does not anſwer by the next morning repeat the doſe. Keep him from bad food, and give him warm water with ſome bran to drink, and he will perfectly recover.

CHAP. XXIV.

For the convulſions in the bowels.

THIS is a name by which farriers expreſs a degree of the cholic much worſe than the preceding, and often very dangerous. The farmer will know it by theſe ſigns. The horſe ſtretches out his legs, neck, and his belly; he rubs himſelf againſt the walls; ſtamps upon the ground violently with his feet; and lies down and gets up again many times together. His belly looks ſwelled; and in the beginning of the diſorder his mouth is very hot: afterwards it is cold; and then he is in great danger.

Bleed him moderately; then give him the glyſter laſt directed, only adding to it a quarter of a pint of gin. Diſſolve one dram of philonium romanum in half a pint of mountain wine: add to this a quarter of a pint of ſweet oil, and two tea ſpoonfuls of ſpirit of hartſhorn, give him this as a drench; and ride him or walk him ſoftly after it.

If this does not anſwer in three hours, grate a couple of nutmegs, put them into a quarter of a pint of gin: add a quarter of a pint of ſweet oil, and one dram of powder of ſaffron. Give him this and walk him ſoftly. If there be no amendment repeat the glyſter. Then give him theſe two drenches alternately once in four hours, 'till he is well.

CHAP. XXV.

For cracks about the feet.

WHEN this diſorder is taken in the beginning, it may be cured by the method we have directed for ſore heels; but when it comes to an inveterate height, and the cracks are deep, and their edges hard, it is to be treated in a different manner. Boil a good quantity of marſhmallow roots and bran in ſome water, and ſtraining this off beat it up to a thick lather with ſoap. Let the heels all about the cracks be thoroughly ſoaked and waſhed with this: and then dry them.

Set on an earthen pipkin with a quarter of a pound of hog's lard, and the ſame quantity of venice turpentine. When they are melted throw in half an ounce of bees-wax ſliced thin, and when that is melted duſt in half an ounce of powdered verdigreaſe. Stir it all very well together; and when it is mixed take it from the fire, and ſtir it now and then till it is cold. When the heels are dry from the waſhing, anoint them thoroughly and carefully with this, both on the edges and within: then ſpread ſome of it upon leather, and wrap round the heels. Let this be kept on by tying; and not removed till the next morning: then let the whole dreſſing be repeated as at firſt, waſhing, anointing, and covering them up. Let this be repeated every day, and there will be a ſpeedy amendment, and in ſome time a laſting cure.

CHAP. XXVI.

For ſwelled heels.

THIS is an accident to which horſes are liable that are kept in ſtables, when they have no other complaint. Bleeding is ſerviceable, and it is no way ſo well performed as by leeches upon the part. In a morning let the horſe be led into a pond that is ſhallow, and has a good many of them in it. Let him be kept ſtanding there ſome little time, and they will faſten on him of themſelves. There let them take their chance: they will preſently make a good bleeding, and the horſe will ſoon recover.

CHAP. XXVII.

For a ſtrain.

DISSOLVE two ounces of caſtile ſoap in as much ſpirit of wine as will melt it: the ſoap muſt be cut into thin ſlices, and put into a jar with the ſpirit of wine, and ſet in a warm place. When this is diſſolved put in half an ounce of camphire; that will melt preſently, and then the whole will be fit for uſe: it is a kind of opodeldock, and will anſwer all its purpoſes. Let the ſtrained part be rubbed with it very well with a warm hand every night and morning, till the cure is compleated.

CHAP. XXVIII.

For running eyes.

THIS may always be cured by the timely uſe of the following water. Take four handfuls of ground-ivy, cut it ſmall, and then beat it in a marble mortar. Boil ſix eggs hard, chop the whites to pieces and put to the ground-ivy, then beat them again. Put in half a pint of mountain-wine, and a quarter of a pint of roſe-water; and add an ounce and half of white vitriol, and the ſame quantity of white ſugar candy firſt beat to powder in another mortar. Beat all theſe well together, and then put them into an earthen pan. Strew ſome baſket ſalt, about an ounce, over them, and covering the pan ſet it in a cellar to remain ſix hours. Then make a bag of thin flannel like a jelly-bag, hang it up and ſet a pan under it. Pour in all that is in the pan, and there let it remain till the whole liquor is gone through without ſqueezing.

Put this up in a bottle, and every morning and evening drop ſome of it into the horſe's eyes, and rub them gently with it, dipping the end of a ſoft feather into it for that purpoſe.

CHAP. XXIX.

For a film growing on the eyes.

BOIL an egg hard; ſeparate the yolk and chop the white to pieces. Mix with it ſome baſket ſalt, and put it into the ſhell of another egg that can be kept whole, and ſet it over the fire. Let it ſtand till it will come to a powder. Mix this with two ounces of honey and three grains of white vitriol in powder. Put this a little at a time into the eye with a feather, and it will often make a perfect cure. This muſt be done as ſoon as the diſeaſe ſhews itſelf; for it is not to be depended upon afterwards.

CHAP. XXX.

For cramps.

CRAMPS are diſcovered by the creature's uneaſineſs, and by the drawing up of his limbs. Put into a large bottle a pint and half of vinegar and a pint of oil; ſhake them well together; then wet a woollen cloth with them and wrap it round the limb. If the cramp do not go off before this is dry, repeat the ſame thing, wetting the cloth well again, and it rarely fails to compleat the cure.

CHAP. XXXI.

For the anticor.

THIS is a pain in the breaſt of a horſe, often very troubleſome, and frequently the forerunner of danger. It riſes from the eating too great a quantity of rich freſh food: as when a horſe has been turned looſe at once into a clover field: the cure is this. Firſt bleed him moderately; and then give him the aloe purge before directed. If he is not much better let him be blooded again the day after, and the purge be repeated, as there may be occaſion; and all the time let him have moderate wholeſome diet, and ſome exerciſe.

This diſorder in horſes is very like a ſurfeit in our own ſpecies, and is to be cured in the ſame manner: nothing is required but cooling and opening the body: and if this be not done the diſorder will gather ſtrength, and much worſe will follow. The farmer will eaſily know by the horſe's going, whether he is growing worſe or better. If he faulter in his legs, and have a ſtiffneſs in his neck, all is going wrong: if he take frequent tremblings, it is worſe: the bleeding muſt then be repeated immediately, and the purge muſt be given every other day till he is well. The quantity of blood loſt at two, three, or four bleedings upon ſuch an occaſion, will never do the creature any harm; and the cure entirely depends on it.

CHAP. XXXII.

For ſickneſs at the ſtomach.

THIS diſorder is uſually owing to the eating freſh meat too careleſsly. I have ſeen a horſe from an over-feeding upon clover caſt up all he takes both of food and water; and in this manner he will go on to his deſtruction, if not timely remedied.

Make a quart of ale hot, and diſſolve in it half an ounce of venice treacle, a quarter of an ounce of philonium romanum, and a dram of powdered cinnamon. Give him this as a drench; and if it ſtays upon his ſtomach, give him an hour afterwards a feeding by hand of ſmall bits of bread, and a very little lock of hay. This will continue upon his ſtomach, and he will recover.

If the drench did not ſtay upon his ſtomach, give him the following. Heat half a pint of red port wine with a lump of ſugar: put into a baſon three drams of ſalt of wormwood, ſqueeze in four lemons, and ſtir it about till the ſalt is diſſolved: then when the wine is boiling hot ſtrain this to it, and give it him for a drench. This will be ſure to ſtay upon his ſtomach, if the other does not; and afterwards he is to be fed as before directed.

CHAP. XXXIII.

For the yellows.

THIS ariſes from an overflowing of the gall, and it may be called the jaundice in horſes; for it proceeds from the ſame cauſe as that diſeaſe in our own ſpecies; and is to be cured by the ſame kind of medicines. It firſt ſhews itſelf by a yellowneſs in the horſe's eyes. Then the ſkin of the under part of his upper lip next to his fore teeth is tinged yellow; and then he grows faint and unable to perform his buſineſs. He will fall down as he is in the ſtable, be covered with ſweat as he ſtands ſtill, and often ſhiver.

Beat in a mortar a hat crown full of freſh great celandine; add to this four ounces of powder of turmerick and a pint of white wine. When all is well beat together preſs out the juice, and put to it in a large bottle one dram of powder of ſaffron, and the clear juice of four lemons. Shake all well together. Bleed the horſe in the neck moderately; and an hour after give him for a drench a pint of hot ale and a quarter of a pint of this mixture. Let the ſame be repeated every night and morning till he is perfectly recovered; giving him moderate exerciſe.

CHAP. XXXIV.

For the ſwelling of the ſpleen.

THIS diſorder renders a horſe feeble and untractable: he faints in the ſtable, loaths his food at ſome times, and ſnatches at it voraciouſly at others; and he is frequently looking to his left ſide, lying down upon it, and rubbing it againſt any thing. The herb agrimony is a certain cure: but it muſt be taken for ſome time. The diſorder riſes from an obſtruction in the ſpleen.

Gather a good quantity of this plant freſh out of the fields, and cut off the tender tops. Beat theſe in a mortar, and add a little ſugar, make them into a conſerve, and ſet this by Then pound the reſt of the plant, and mix ſome beer with it by degrees as it is beating: and when it is all a maſh preſs out the juice. Roll up a ball of the conſerve, and rubbing it over with butter give it to the horſe in the manner of a pill. After it give him half a pint of the juice preſſed out as before directed and made warm.

Let this be repeated every morning and night; and give him moderate food and good exerciſe. He will not be able to bear the exerciſe well at firſt, but he will do better daily: and by that it will be ſeen that he is growing well: the courſe muſt be continued till he is quite recovered; which will be known by his leaving off rubbing and looking at his left ſide.

C H A P. XXXV.

For the heat of urine.

THIS is the ſame with the ſtrangury in our own ſpecies: it is to be cured eaſily if taken in time. I have obſerved it very often in autumn, and ſcarce at all any other ſeaſon in the year; and I am convinced it is owing to certain inſects the cattle of many kinds eat at that time, in cropping the young ſhoots of trees, ſhrubs, and hedges.

Every one knows that the taking of the ſmalleſt quantity of the drug called cantharides or ſpaniſh flies, occaſions a ſtoppage aud heat of urine. Cantharides are a kind of green beetles found upon buſhes in Spain; and we have the ſame kind, but ſmaller, in England. They live among the young ſhoots of trees at that ſeaſon; and are ſwallowed up by the horſes that crop them: a heat of urine comes on, and the horſe is in terrible pain: the part ſwells and inflames, and he is continually wanting to make water, though he can make only a drop or two. His blood is inflamed at the ſame time; and if due care be not taken, the conſequences will be dangerous.

Chop to pieces four pounds of the roots of fennel, ſix pounds of the roots of mallows, and two pounds of the roots of parſly. Set them on to boil in a copper witb eight gallons of water, and put in three pounds of french barley. Let them boil together half an hour, ſtirring them well about: then when the whole is a little cooled ſtrain off the liquor, and ſqueeze it hard. Give the horſe equal quantities of this liquor and milk mixed together warm for his drink; and let him drink as much of it and as often as he will. The heat of his blood will make him thirſty, andthe quantity he ſwallows will ſoon be a cure.

CHAP. XXXVI.

For difficulty of urine.

THIS is a diſorder the farmer muſt not confound with the other: they ſomewhat reſemble one another; though they have different cauſes, and require a different cure. The former is an inflammation: this is an obſtruction by gravel.

It is ſeen by the creature's ſtraining very hard to void his urine, and often without being able to make any. Let the part be examined; and if there be no heat or inflammation, this is the caſe. Alſo if the diſeaſe be of more continuance; and if the horſe can ſometimes void a great deal. Boil a large quantity of French barley in water, and mix the liquor with all the water he drinks; and give every morning the following drench. Take juice of arſmart and parſley-pert, of each a quarter of a pint; ſweet oil ſix ſpoonfuls, and oil of turpentine half a ſpoonful; give it warm, and an hour after let him drink plentifully.

CHAP. XXXVII.

For bloody urine.

THIS is generally owing to over-working; eſpecially when with a great deal of work the creature is fed poorly. Bruiſe a large quantity of that wild craneſbill, which is called herb Robert: ſqueeze out the juice, and add to every pint half a dram of alum powdered, and two drams of dragons blood. Give half a pint twice a day till he is well.

CHAP. XXXVIII.

For the vives.

THIS diſorder is a ſwelling in the kernels, between the chop and the neck. It proceeds from cold; and when it is attended with much inflammation may be dangerous. Bleed him largely, and pour into his ears juice of rue mixed with a good quantity of pepper. Tie the ears round to keep it in; and if he be not better the next day repeat the bleeding, and afterwards give him the common purge ſet down before.

CHAP. XXXIX.

For ſoreneſs in the noſtrils.

THIS diſorder is very troubleſome to horſes at graſs; and thoſe are moſt ſubject to it which are fed in low wet grounds. It is to be cured by an outward application in this manner. Bruiſe ſome plantain and preſs out the juice. To a pint of this put a pint and a quarter of vinegar, and two drams of alum. Mix all well together; and firſt waſh the part clean: then anoint and rub it gently with this liquor. Repeat this every day once or twice; and if it do not take ſpeedy effect put in more of the alum: according to the nature of the diſorder more or leſs will be required; but this is generally ſufficient.

C H A P. XL.

For bleeding at the noſe.

THIS is an accident to which horſes are liable, in the ſame manner as our own ſpecies; but it is uſually much more violent. It is to be treated according to the degree of it in a different manner.

If it be very violent the horſe muſt be blooded in the flank. While he is bleeding the following mixture is to be prepared. Bruiſe in a mortar equal quantities of clown's allheal, and wood betony, add to it a little ſalt, a little allum, and ſome colcothar of vitriol; when all is beat together thruſt ſome of it up the noſtril that bleeds, and keep it firmly to the place till it is ſtopped.

As there may be danger of its breaking out again in the night, there ſhould be a quantity of the ſame mixture thruſt up in the evening, and by means of a bandage it ſhould be kept in. When the occaſion is leſs violent the bleeding may be truſted alone; and when moſt ſlight of all the herbs pounded without any addition will anſwer the purpoſe.

C H A P. XLI.

Of diſorders of the mouth.

A Horſe is ſubject to various diſorders of the mouth, known by different names: ſome require the hand of the farrier; but the greater part may be cured by the farmer himſelf. The growth of bad fleſh over the gums, which is called the lampaſs, is to be remedied by burning with a red hot iron: for this the ſmith or farrier is fitteſt, becauſe practice is the beſt director. For thoſe cracks and warts in the palate, and little puſtules and inflammations, the remedy is this. Gather a good quantity of freſh leaves of wormwood, ſtamp them and preſs out the juice, mix an equal part of this and of Ægyptian ointment, and ſtir theſe well together; then, with a piece of rag tied to the end of the ſkewer, rub over the parts that are ſore, and they will be cured in a few times dreſſing. Swellings under the tongue are cured in this manner.

C H A P. XLII.

For looſe teeth.

THE teeth of a horſe will be ſometimes ſore, ſo that he cannot chew his meat, or they will be looſe; theſe are great inconveniencies, and muſt be remedied ſo far as may be, as ſoon as they are perceived. For ſoreneſs in the teeth uſe the following waſh. Gather ſome leaves of wood betony, and boil them in ale till it be very ſtrong of them: then ſtrain it off, and mix with it an equal quantity of the ſharpeſt vinegar. Heat this as hot as can be borne, and waſh the gums about the roots of the teeth with it every night and morning: feed the horſe for ſome days with the ſofteſt food that may be, and then leave him to his common life again.

This is a remedy for ſoreneſs of the gums; but when the teeth come to be looſe the caſe is much worſe. After the gums have been well waſhed with the liquor before directed, bring in ſome freſh leaves of elecampane, and rub the teeth and gums with them: ſometimes this will take effect. Let the horſe be blooded, and let him be fed for ſome days with ſoft meat; as boiled oats, and the like things: for the not forcing them is a very great article in the cure.

CHAP. XLIII.

For foundering.

THE cauſe of foundering is commonly hard ſervice and bad management; from theſe joined together the creature gets a diſorder in the feet, ſo that he is hardly able to ſtand: he will quake and totter; and will be ſcarce able to keep up in going.

The farmer ſhould have a particular care of thoſe things which occaſion it. The ſetting up a horſe when very hot in a cold ſtable without litter is one cauſe. The riding him into ſhallow water, and letting him ſtand with his feet under it a conſiderable time when very hot, is another; and many other careleſs tricks of the ſame kind may have a like effect.

Beſides theſe there are other accidents that will occaſion it: as the wearing ſtrait ſhoes, and travelling a great deal upon very rough and hard ground. Sometimes a horſe is foundered on all his feet: this happens from the ſtanding in water when hot; but more uſually he is foundered only on his fore feet: ſometimes the foundering is only on the hinder feet; but this is leſs common.

When he is foundered on the fore feet he reſts upon the hinder ones as much as poſſible, and is careful how the fore feet go to the ground: and when the hinder feet are affected, he reſts himſelf almoſt entirely on the fore; not letting the others come down hard at any time. This complaint is alſo known by his ſeeming weak behind as he goes.

The method of cure is this. Let the horſe be taken to a careful farrier, and let the owner ſtand by, to ſee his operations. He is to pare away the hoof gently till he comes to the quick, and then to bleed the foot in four or five places at what they call the toes. This being done, put into an earthen pipkin equal quantities of tallow and yellow roſin; let them melt together perfectly: then lay on a quantity of this upon every part whence the blood came.

This done, let hollow ſhoes be put on; and let another pipkin be ſet on with equal quantities of tallow and tar; when theſe are well melted together put in ſome bran, and ſtir all again. Then make this very hot, and ſtop the hollows of the ſhoes with this. Let this be repeated every day for eight days, during which time keep him quiet and give him moderate food.

After this bring him to more exerciſe by degrees. Sometimes this method will make a cure, but not always; for there are ſtages of this diſorder which nothing can relieve.

CHAP. XLIV.

For wind-galls.

WIND-GALLS are a diſorder of the feet, brought on by travelling in hard ways. There are little ſoft ſwellings containing a kind of jelly, on each ſide of the fetlocks. The remedy is eaſy. They muſt be opened to let out the matter, and then dreſſed with a piece of black pitch ſpread upon leather.

The common practice is to prick them with a nail, but this is very injudicious. Let the farmer follow the practice of the ſurgeons; for the buſineſs is of the ſame nature, and they have beſt ſtudied how to perform it. When they are called to open a ſwelling, they do not perform this by pricking it, or making a ſmall hole for the matter to come out; but they cut it with their lancet all the length; and ſometimes again croſs-wiſe: this lets out all the matter, and gives the dreſſing its full power. In the ſame manner in theſe wind-galls, and all complaints of the like nature, let the farmer open the ſwelling from top to the bottom; and when the matter is fully and entirely out then put on the dreſſing. In this caſe the whole malady is remedied at once; for the horſe is well by that time the plaiſters come off, which they will of themſelves in a few days.

I have heard farmers complain of theſe wind-galls returning again and again after pricking; and in this caſe they will diſorder the feet of a horſe at length to his deſtruction: it is owing to this method of pricking inſtead of lancing: in that caſe all being cleared there is no fear of a return; but when the ſwelling is only pricked a part of the matter is left behind; the hole preſently fills up, and then there is a freſh gathering; and this as often as it is diſcharged in that wrong manner.

CHAP. XLV.

Of the anbury.

THIS is a ſwelling or puſtule, like a bloody wart upon different parts of the body of a horſe, and is owing to accident, without any diſtemperature in the blood. The cure is this. Bruiſe ſome plaintain leaves, and preſs out their juice. Mix three ſpoonfuls of this, three of vinegar, and two of honey; and ſtir in half an ounce of powdered allum. Burn down the wart with a red hot iron, cloſe and even to the body; and then anoint it with ſome of this mixture. Repeat this anointing night and morning till it is well; and it will never return.

As this diſtemper is ſometimes attended with a bad ſtate of the blood, a further caution is then neceſſary. The farmer may be ſatisfied nothing more is amiſs, if the anbury is perfectly and ſoon cured by this method, and does not appear again in other places, but if the complaint riſes in one place, when it is cured in another; and eſpecially if at the ſame time the creature be groſs, full of foul humours, and have other diſorders upon the ſkin, there muſt be care taken of the whole maſs, as well as of theſe ſingle eruptions. Let the horſe be blooded; then let the ſeveral anburies be burnt down and dreſſed in the manner we have directed, and let there be flower of brimſtone and crude antimony in powder ſprinkled amongſt all his food.

During this let the owner watch the appearance of others breaking out; and always burn them down as they come.

CHAP. XLVI.

For a general decay.

SOMETIMES a horſe will fall into a general decay, without any apparent cauſe: he will be weak and faint, his coat will grow rough, and he will loſe his fleſh till he ſeem dying: this is to be remedied, if taken in time, by the following medicine:

Take ſix pounds of fine wheat flour, mix with it two ounces of aniſeeds in powder, and three quarters of an ounce of cummin ſeed, alſo powdered; ſeeds of carthamus powdered, a dram and half; fenugreek-ſeed an ounce and half, flour of brimſtone two ounces, powder of vipers three ounces, powder of ſaffron one dram, and powder of cochineal a dram and half. Mix all theſe powders perfectly together, ſtirring them about; and then put to them a pint of ſallad oil, a pound and half of honey, and two quarts of white wine. Work this into a paſte, adding a little flour, if it be too ſoft; and a little wine, if it be too hard: when it is well wrought, make it up into balls of the bigneſs of a man's fiſt; and give the horſe one of theſe every morning in the water he is to drink, and the ſame every evening. Let the water be cold, and if he diſlike it, give him no other. When he is thirſty he will take to it. The getting him once to drink it is all the difficulty, for he will afterwards like it better than any other. In this manner he will be perfectly cured in three weeks; and will recover his fleſh and ſpirit. Care is to be taken that he be kept upon good food, and have gentle exerciſe, but never to fatigue him; and that he lie clean and dry.

BOOK XIII. SECT. II.

Of COWS and OXEN.

Chap.
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2. *Of binding of the body.*
3. *Of looſeneſſes in general.*
4. *For a common looſeneſs.*
5. *For a looſeneſs with ſharp ſtools.*
6. *For a looſeneſs with bloody ſtools.*
7. *For a looſeneſs with great heat of body.*
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Chap.
10. *For a running at the noſe.*
11. *For worms.*
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18. *Of the panting evil.*
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20. *Of the gargil.*
21. *Of the garget.*
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The INTRODUCTION.

THESE creatures are not liable to ſo many diſorders as the horſe; but there is nothing of greater importance to the farmer than a right knowledge of thoſe to which they are ſubject. A diſtempered cow or ox are worth little. Moſt of their diſeaſes, as they are of a more ſimple nature than thoſe of the horſe, are eaſier of cure: but there are ſome which we ſee mock all the art of phyſic, and all the rewards a government can propoſe for deviſing a remedy. The fatal diſorder that has now raged ſo many years is a terrible inſtance.

We have examined this with all the attention ſo weighty an affair demands; and hope we ſhall be able to propoſe ſomething on that head worthy the attention of the farmer and of the public. We ſhall begin with diſeaſes of a leſs terrible kind, that the huſbandman may be led, by degrees, to the moſt difficult.

CHAP. I.

For the fever.

THE farmers find their cows and oxen ſubject to fevers; and theſe, though they generally will go off kindly by aſſiſtance, often are of very bad conſequence when neglected. The moſt common occaſion is a ſurfeit, and ſometimes they will ſeize them without any viſible cauſe. The creature foams at the mouth and hangs down the head; the eyes look heavy, and the whole body trembles: and it frequently groans very mournfully and heavily. It is hot and reſtleſs, and does not care for food, but is continually deſiring to drink.

Moſt other diſorders are attended with a fever; therefore it is natural that feveriſh ſymptoms appear with them: let the farmer, when he ſees theſe ſigns, firſt examine whether there be not ſome others belonging to thoſe diſorders, we ſhall deſcribe hereafter: if there be, then he is to level his remedies at the diſeaſe they indicate; thoſe ſigns of a fever being ſymptomatic: and as the other diſorder is the real cauſe of them, when that is removed they will go off.

When there are the ſigns of a fever only, he will find the following method of cure ſucceſsful. Bleed the creature: and as to the quantity, that is to be guided by the nature of the diſorder, and the condition of the body: if it be a very violent fever, more blood is to be taken away; if leſs violent, leſs: and if it be an ox, he may be blooded more freely than a milch cow. A quart of blood may be very properly drawn from the former; but it is a general and wiſe rule, that there never ſhould be more than a pint taken from the latter. Though, if the ſymptoms encreaſe, the bleeding may be repeated after four and twenty hours.

When the creature has been blooded, ſet it up warm, and give it no victuals. Boil, in ſix or eight gallons of water, a baſket-full of plaintain-leaves and roots, and half a dozen handfuls of agrimony, ſtrain them off, and let the creature drink of this, warm, as often as can be.

The next day give a quart of ale, with half an ounce of venice treacle in it; and repeat this once in eight hours. Give ſome very freſh hay, ſprinkled with cold water, after all this; and, by degrees, the beaſt will grow well.

During all the time the lips muſt be frequently rubbed and cleaned, for they furr with the heat, and unleſs this care be taken, it will not eat or drink. Let the creature be kept up till perfectly recovered, and after that let it be taken ſome care of ſeveral days.

CHAP. II.

For binding of the body.

THIS is a diſtemper to which theſe cattle are very little liable, but when it does happen, it is to no creature ſo dangerous. If the purges uſed for horſes, be given to cows and oxen in this caſe, they bring on a diſorder in the other extreme, that is much worſe than the firſt.

The following is a ſafe and excellent medicine. Take a quarter of a pound of ordinary manna, melt this in a pint and a half of ale, put it into a bottle, and add to it half a pint of ſweet oil, and ſix ounces of lenitive electuary. Shake all very well together, then pour out a gill and half of it: warm this, and give it every morning and night till half the quantity be taken: and then every morning only till the remainder is taken. This never works as a purge, but it gently produces the effect, bringing the creature's body to a due condition; and as this is brought on gradually, it is ſure to continue.

CHAP. III.

Of looſeneſſes in general.

THIS is a diſorder to which cows and oxen are more liable than the former; and it is difficult of cure, if not taken in time. When it firſt comes on, it affects them no other way than by making the diſcharge thinner, while it retains its natural colour: after this it becomes paler and ſharper, giving the creature great pain; and after that the ſtools grow bloody. Theſe are the three ſtages of the diſtemper. The farmer is to regard them carefully, for there is to be a different courſe of medicines for each.

CHAP. IV.

For a common looſeneſs.

BOIL half a pound of freſh roots of biſtort in two quarts of water. Strain off the liquor, and add four ounces of whiting, and an ounce of diaſcordium, made without honey: give the creature half a pint of this, warm'd and well ſhook up, three times in the four and twenty hours, till the complaint ceaſes. Sometimes a ſingle doſe performs a cure; but in that caſe it will be proper to give another doſe, morning and night, for two days, to prevent a return.

CHAP.

CHAP. V.

For a looſeneſs with ſharp ſtools.

IF the former medicine have not ſtopped the diſorder; or if the farmer have not obſerved it till it comes to the ſecond ſtage, that is, till the ſtools are ſharp and diſcoloured, the following remedy is to be uſed.

Bruiſe half a pound of the dry root of tormentill, and boil it in two quarts of water to a quart. Squeeze this off, add to it a quart of rough red wine: add alſo a quarter of a pound of whiting, two ounces of diaſcordium without honey, and one ounce of japan earth. Shake this very well together. Warm it every time it is given, and let the cow have half a pint for a doſe, three times a day, till perfectly recovered.

CHAP. VI.

For a looſeneſs with bloody ſtools.

THIS diſorder ſometimes comes on at once; but more frequently it is the conſequence of neglect, or wrong medicines given for the others; or of the violence of the diſorder.

The courſe of the diſorder is this: a ſharp humour falls upon the bowels, and the ſtools are thin and cutting. After a time they wear off the ſlimy coat of the bowels, and then what comes away is diſcoloured: after this they wear the very inſides of the guts themſelves, and then come bloody ſtools. This is the laſt and worſt ſtage of the diſtemper.

The following method is to be taken: firſt let the creature be blooded, but not largely; then prepare this medicine: bruiſe half a pound of dry roots of tormentill, ſix ounces of dry pomegranate bark, and two pounds of the leaves and roots of plantain. Boil theſe in three quarts of water to two. Then put in two ounces of cinnamon pounded: let it boil a few minutes longer, and then take it off. Set it by to be cold, then ſtrain it off: add to this three ounces of dragon's blood, in powder, and a quarter of an ounce of roch-allum. Shake all thoroughly together; and when it is to be given, warm a gill and half, and give it three times a day.

CHAP. VII.

For looſeneſſes with great heat of body.

WE have named the ſymptoms of a fever in theſe creatures; and they may happen with other diſorders. A purging is one of thoſe, and in that caſe it is not to be treated as a fever alone, neither is the diſorder to be conſidered only as a purging: a due regard is to be had to both.

Slice ſix ounces of the root of the herb called avens, or herb bennet. It is not ſold at the druggiſts, but is common on ditch-banks. The flower is little and yellow; the head is a ſmall burr; and the root ſmells like cloves. Let this be boiled in three quarts of water to two quarts, adding, toward the end of the boiling, an ounce of fine cinnamon, and two ounces of chips of logwood. Strain off this liquor, and add to it an ounce of powder of virginian ſnake root, and a pint of red port wine. Give the creature half a pint, warm, twice in twenty-four hours.

CHAP. VIII.

For the obſtruction of the liver.

THIS is what the farmers call by the general name of an inward ſickneſs. An uneaſineſs is ſeen in all their actions; and a lazyneſs or unwillingneſs to move. To this is to be added a ſcurfyneſs, and harſh dryneſs of their lips, and a dryneſs of their noſes in a morning.

When theſe cattle are well, in the morning, there is a drop of dew, like a pearl, hangs upon the noſe; but when they are ſick it is wanting. No diſeaſe ſooner takes the effect of getting off this mark of health, but it is not peculiar to this. The remedy is this:

Take a pound of great celandine, dug up with the roots, cut it all to pieces, and put it into a pot, with two gallons of water, let it boil up a few minutes; then add half a pound of madder root, ten ounces of turmeric, and four ounces of freſh roots of fennel. Boil theſe very well, and ſtrain off the liquor. Get a hat-crown full of wood-lice, pound theſe with a pint of white wine, and ſqueeze out the juice, then add this to the ſtrained liquor. Shake this up every time it is to be uſed, and warm half a pint of it for a doſe. It ſhould be given night and morning for ten days. This is the uſual time required to perform a cure: it may be ſooner, or it may require a few days longer; but the medicine will hardly fail.

CHAP. IX.

Of bloody urine.

THIS is a diſorder to which cows are very liable, and, if not taken care of in time, it is fatal. The method is this:

Take the cow into a warm houſe, where ſhe is to be kept till cured. Bleed her three quarters of a pint, and then give the following medicine: gather a baſket-full of that ſort of cranesbill, called herb robert. Stamp it in a marble mortar, and preſs out the juice; give the cow a quarter of a pint of this every morning and night: it generally will perform a cure in about three days.

It is a kind of ſpecific for the diſorder, and cures with ſurprizing quickneſs: but there are ſome caſes in which other diſorders bring on this bloody urine, and then this medicine does not anſwer. Let it be tryed only ſix or ſeven doſes, and if that do not ſucceed, have recourſe to the following.

Boil in a gallon of water a great quantity of the ſame herb robert, and as much ſhepherd's purſe. When they have boiled well half an hour, put in a good ſtick of cinnamon; and after boiling a few minutes longer, ſet it off the fire. Then ſtrain it and ſet it by to cool. Diſſolve in this two drams of ſugar of lead, and add one hundred drops of ſpirit of vitriol. Shake all well together, and give the creature a gill of it cold every four hours, till the cure is perfected.

CHAP. X.

For running of the noſe.

THIS diſeaſe which grows to a terrible height in horſes, under the name of the glanders, is very ſlight in theſe cattle. It proceeds from cold, and as they hold their heads down it is not eaſily cured, and will encreaſe upon them in time, if not ſtopped.

Take the creature up, and let it be kept warm. Bleed it about a pint, and then give the following: boil a pint of ale, and diſſolve in it half an ounce of venice treacle. Give it warm, and let it be repeated every night and morning. Give the creature good provender, and uſe the following application to the part. Melt ſome freſh butter; and ſtir in as much flower of brimſtone as will make it a thick ointment. Rub ſome of this all over a couple of gooſe feathers, and warm them a little before the fire; anoint the inſide of the noſtrils every morning and evening with this, till the diſorder ceaſes.

CHAP. XI.

For worms.

COWS and oxen are ſubject to have worms in their bowels, and are greatly diſordered by them; they will prevent their thriving, and make them reſtleſs and untractable. The remedy is this: chop to pieces ſome ſavin-tops, and leaves of bear's foot, mix with theſe a little ſalt of ſteel, and work up the whole into a ſort of paſte with butter. Divide this into ſmall balls, and give one of them every morning early for a week or longer: keep the creature without meat three hours after, but let it drink as much as it chuſes.

If this medicine do not ſucceed alone, it muſt be aſſiſted in the following manner: diſſolve half an ounce of black ſoap in a quart of ſweet-wort, and give this every morning after the ball of ſavin. In this manner the cure will uſually be perfected in a few days.

CHAP. XII.

Of worms in the tail.

BESIDE worms in the bodies of cattle, there are a very troubleſome kind that breed and live externally in the tail. They torment the creature, waſte their ſtrength and ſpirits, and keep them pining. They uſually grow lean; their backs become weak; when they are lain down they are ſcarce able to get up again, and they have a faintneſs in their looks and motions.

When the farmer ſees a cow or ox in this condition, let him examine the under parts of the tail. He will perceive the hair is fallen off; and that there are a multitude of little ſores; and, upon further examination, he will ſee the tail is almoſt eat aſunder in ſeveral places at the joints.

This might ſeem a natural ulcerated ſtate of the tail; but it is, in reality, owing to eating worms, which will be found eaſily enough upon looking after them. They are occaſioned by foulneſs of the tail, which tempts a particular kind of fly to lay its eggs there. The condition of the tail draws more flies to blow it, like meat that begins to putrify, and thus the diſeaſe continually encreaſes.

It is only in ſummer the diſorder takes its riſe; though, when once eſtabliſhed, it will continue at all ſeaſons. Precaution is in all theſe caſes eaſier and better than a cure: it is foulneſs on the under part of the tail in cows, that firſt brings the flies to them. It is therefore the buſineſs of the farmer to remedy the diſadvantage.

The dung of the cow and her urine, will hang upon this under ſide of the tail; and after calving, there will be alſo greater inconveniencies of the like kind: let a perſon be employed, once in three or four days, to clean the tails of the milch cows, in particular in this part, and of the oxen, as there may be occaſion. This will be very agreeable to the creatures: and there will be no ſuch thing as the tail worm known. Cleanlineſs will not only prevent the diſorder, but in the firſt ſtages will cure it. The beſt waſhing is performed by a bruſh and ſoap ſuds, and if a few of the worms ſhould be bred, this will perfectly deſtroy them. We hope the farmer will take this care; but as a neglect may have happened, or the diſorder may have ſome way got footing, we ſhall deliver alſo the remedy.

Chuſe a pound and half of freſh new made ſtone lime. Boil a gallon of water, and pour it all at once upon the lime in a very large earthen pan. It will bubble up: ſtir it well, cover it when cold, and let it ſtand all night to ſettle; there will be a very ſtrong lime water, though but a ſmall quantity of it. In the morning let it be poured clear off.

Take up the cows that have the diſorder, and keep them dry while they are under cure. Make a very ſtrong lather of ſoap ſuds in ſoft water; and firſt of all with flannels, and afterwards with a bruſh wetted in theſe ſuds, waſh the tails in every part perfectly clean; and the more to promote the cleaning of them, cut off the hair as ſhort as can be.

After the tails have been thus cleaned and are dry, waſh them in the ſame manner with this ſtrong lime water. Obſerve after four or five days, whether the diſorder be cured; if not farther methods muſt be taken. Once a day will be enough to dreſs the tails by theſe two waſhings, but it muſt be every time done in this careful manner. If theſe fail the following method is to be uſed.

Stamp a good quantity of the freſh tops of rue and ſavin; when they are reduced to a paſte, add a little white hellebore and ſtone ocre, both in powder, and ſome wood ſoot and a little ſalt. Beat all this up again, and then mix in ſome butter. When this is ready, and the tail perfectly cleaned, let it be ſlit along all the way down the inſide, nearly to the bone, and then very thoroughly anointed with this. If this does not cure in three or four times, let the tail be rub'd with a ſmall quantity of the common blue ointment, made of quickſilver, Venice turpentine, and hog's lard.

Theſe ſeveral methods are to be tried one after another. Uſually the firſt ſucceeds, if not, the ſecond rarely fails; but if none will do, the laſt reſource is to cut off the tail. But it is beſt to fatten up the beaſt after this for ſale directly.

C H A P. XIII.

For boils on the fleſh.

COWS are ſubject naturally to large and painful boils; and ſometimes they fall into the ſame misfortune, by means of a fly. When boils come naturally on a cow or ox, the thickneſs of the ſkin, and the cold conſtitution of the animal make them ripen ſlowly, and they heal ſlowly afterwards. Nature is to be aſſiſted in the following manner. Take up ſome white lilly roots, and boil them in milk and water till they are perfectly ſoft. Then lay them hot upon the boil. Bind them on if that can be done conveniently, if not let a perſon hold them on till they are cold. This is to be repeated as occaſion requires; the oftener the better; and the boil will ripen and come to a head.

The opening of a boil when it is in this proper condition, may be done either by a knife, or a red hot iron: the general practice is by the latter method.

When the matter is diſcharged, let it be dreſſed with the following ointment. Put into an earthen pipkin half a pound of tar, three quarters of a pound of horſe turpentine; ſet it on a gentle fire, and as it melts throw in two ounces of hog's lard. Stir all well together, and dreſs the part every day with this warm, till it is healed.

The boils occaſioned by flies, are much more wonderful than any thing relating to this creature, and the diſcovery of it was made by Mr. de Reaumur, of the royal academy of ſciences at Paris, and is delivered in the fourth volume of his memoirs. The ſame thing happens in England, and what we ſee verifies his accounts.

There is a large fly that in autumn teazes the cattle prodigiouſly. It ſettles upon them, and lays its eggs in a ſmall wound, that it makes for that purpoſe in the ſkin. Theſe eggs hatch in time, and the part ſwells with the hurt. A cow ſhall thus be covered with filthy boils, while its blood is in a perfect good ſtate, and this accident the only cauſe of it. There is a maggot in every one of theſe boils, which feeds upon the matter bred there till it is of full growth, and then crawls out and takes its chance for appearing in the fly ſtate.

There is no need to ſuffer the creature to be tormented in that manner till the maggot goes out of itſelf; but the aſſiſtance of a careful hand ſhould be given to clear her of the boils at once. Every one of theſe ſhould be opened with a ſharp knife; and the maggot taken out. The wound is then to be dreſſed once or twice with the ointment before directed, and the creature will be perfectly freed from the torment.

CHAP. XIV.

For diſorders of the lungs.

THESE are of various kinds in the cow and ox kinds, but one remedy will ſerve for them all. Sometimes the creature breathes with difficulty, ſometimes coughs and wheezes. Bruiſe four heads of garlick, and preſs out the juice, mix this with a quart of new milk, and add a quarter of a pint of tar. This will ſerve for four doſes. One is to be given every morning till the cure is compleated. The tar does not mingle well with the reſt, but theſe are not very nice creatures, ſo it goes down. If the diſorder be obſtinate, the creature ſhould be blooded, and the medicine will then take effect.

CHAP. XV.

For foulneſſes of the ſkin.

CATTLE of this ſpecies are not altogether free from blotches, ſcurf, and ſcales on the hide. They muſt inſtantly be taken care of, for the beaſt can never thrive that has them.

Firſt let the cauſe be conſidered, which is often want of cleanlineſs, ſometimes a diſorder in the blood; and in ſome caſes it is owing to both. Foulneſs of diet is the common cauſe of this diſorder in the blood; and this is uſually occaſioned by that ſort of rank graſs which grows in wet places.

Let the firſt thing be a change of paſture: from a low ground full of rank weeds, and abounding with mud, remove the cattle to a high dry paſture, where the graſs is ſweet, and the ſoil gravelly, ſo that there can be no dirt for them. If the diſorder be owing to uncleanlineſs, this change alone will cure the cattle.

If the blood be concerned, let the creatures be blooded: about a pint and half from the ox, and half that quantity from the cow. Then let them be taken in and perfectly cleaned. Warm ſoap ſuds, a ſoft bruſh and flannels are the proper remedies for this foulneſs, or they are the needful preparations for others.

When the cattle have been cleaned, if any ſcales remain let them be picked off; and the next day the waſhing be repeated. This, and the cleanneſs of the paſture, will anſwer this firſt purpoſe.

Next day let the creature be waſhed well over with the lime water; and if any of the ſcabs have grown to a bigneſs ſince they were picked off, they muſt be rub'd again, that the lime-water may get to the root of the diſorder. Let this be repeated three times, at two days diſtance; and let there be ſome flower of brimſtone ſprinkled among the hay that is given them in a morning. In this manner their blood will be ſweetened, at the ſame time that the outward remedies perfectly cure the diſorder.

CHAP. XVI.

Of falling of the palate.

THIS diſorder frequently ſeizes cattle after hard labour and colds, and is of a very troubleſome nature, if not provided againſt in time. When the palate is firſt fallen it is not difficult to replace, and keep it up; but when it has been any time down the difficulty of putting it up, and the readineſs to fall again, are very great. I have known an ox obliged to be killed when it was not intended, nor was he fit, becauſe he would otherwiſe have been ſtarved by the continuance and relapſes into this diſorder.

The farmer will perceive the creature has this diſorder by its great uneaſineſs, and a particular kind of hollow groaning: he will be continually ſtriving to eat, but not able to ſwallow, and thus without care he would go on till entirely ſtarved.

The remedy is this; caſt the creature, and getting the hand into his mouth replace the palate as it ſhould be: then rub over it ſome honey and pepper mixed together, and let him riſe again: half an hour afterwards bleed him a pint and half or more; and thus the complaint, if taken in time, is commonly to be cured without any danger of a relapſe. He muſt not be fed with hay, but for ſome days only with freſh ſweet graſs.

CHAP. XVII.

Of hurts in the feet.

WHEN a cow or ox is obſerved to limp, and keep one or more of his feet from the ground, the occaſion uſually is ſome complaint about the hoof, and nothing is ſo common as a ſoreneſs between the cloves.

Caſt him, and clean the ſpace between the cloves perfectly well, rubbing it till it bleeds. In the ſame manner clean all about the foot. Then chop a quantity of the leaves and tops of mugwort, boil them ſoft in milk and water, and put ſome in between the cloves, and ſome about the whole hoof, tie it on, and let the creature be kept quiet. The cure is generally compleated at one dreſſing. Some accidental foulneſs is often the cauſe; ſo that cleaning it, and laying on a ſoft healing cataplaſm, is a very natural remedy. When the caſe is worſe, and there are actual ſores, clean them as already directed, and then dreſs them with a quantity of black baſilicon ſpread all over ſome tow, and drawn in between the cloves. This ſhould be repeated every day.

CHAP. XVIII.

Of the panting evil.

THIS diſorder ſhews itſelf in the creature's faintneſs and unwillingneſs to ſtir; in his frequent panting, and as it were ſighing. It renders the creature weak, and he generally waſtes in fleſh. The remedy is this: boil a quart of ale, and diſſolve in it half an ounce of mithridate, and a ſcruple of powder of ſaffron. Give this warm every morning for four times: the creature muſt be fed upon dry ſweet hay, and have his drink warm during the cure.

CHAP. XIX.

Of the yellows.

THIS is of the ſame nature with the jaundice. It is perceived firſt by a yellowneſs in the eyes; and in the lips; and the creature is always lazy and weak.

Bruiſe in a marble mortar a baſketful of great celandine roots, leaves and ſtalks together: add to this a good handful of rue, and then ſqueeze out the juice. Mix with this an equal quantity of juice of wood lice, and give the beaſt a gill and half of it every morning, for a week; and afterwards every other morning for a week longer. In this time the cure is generally compleated, and there is no danger of a return of the complaint.

CHAP. XX.

Of the gargil.

THIS is a terrible diſeaſe, and more difficult of cure than moſt others. It is an external ſwelling and inflammation; but the blood is always concerned; and the diſorder ſpreads and defies all outward remedies. It appears firſt in the lower part of the dewlap, in a hard inflamed lump, which ſpreads till it occupies the whole dewlap, and reaches to the throat, in which caſe it is often fatal.

This is the diſorder called the gargil. It affects the dewlap and throat only; and it is the firſt ſtep to the moſt dangerous diſorders; but it is of a diſtinct nature in itſelf, too often deſtroying the cattle without encreaſing to any greater degree of malignancy.

The gargil and garget are treated by writers, as the ſame diſorder; but this is the diſtinction.

The gargil is a ſwelling in the dewlap and throat, extending no farther; the garget is a ſwelling of the head and eyes, with other external parts, with inflammation; and the murrain is the ſame ſwelling and inflammation, extending itſelf alſo to the inſide of the throat, the ſtomach, and the bowels.

This laſt is the diſtemper now, and of many late years ſo fatal among the horned cattle: it becomes the farmer to underſtand it in all its progreſs; and if the phyſicians who have written ſo much about it had deſcended from the cloſet to the cow-houſe, they would have found the ſame facts; and knowing ſomething of the cauſe, they would have been more likely to have made a proper judgment as to the method of cure.

The ſtate of the three diſtempers is this. The gargil can never change to the garget; and if ever it ſeems to do ſo, it is that the farmer has obſerved the throat more than the head and eyes, when they have been alſo affected, and the diſorder has been the garget all the time, while he took it for the gargil. The gargil very ſrequently changes into the murrain; but the murrain may begin without it. A ſwelling of the outer parts of the head and neck, which is the garget, may ſpread inwards, and be converted into a murrain; or the inflammation and ſwelling may begin in the inner parts, and then it is moſt dangerous, becauſe leaſt ſeen; and is moſt infectious becauſe the breath conveys it to all which have their heads near: this is the murrain appearing in its proper form; and is of all the moſt fatal.

As ſoon as the gargil is perceived, let the following ointment be prepared. Melt together equal parts of pitch and turpentine, and add a ſmall quantity of bees wax. Slit open the dewlap three inches in length where the ſwelling is, and let it bleed freely. Bruiſe in a marble mortar a handful of the leaves of the great black hellebore, and add to them ſome hog's lard: beat the whole up, and thruſt in a good quantity into the ſlit. Sow up the wound to keep in the ointment, and keep the creature clean, warm and quiet for two days. Then open the ſtitches, take out the remains of the hellebore, and melt ſome of the ointment juſt directed to be made: dip a large pledget of tow in this, and put it into the wound hot. Repeat this dreſſing every day till it heals.

This generally proves a remedy for the gargil, when it is not of a very violent kind; and when it is, ſcarce any thing will be effectual. The addition of equal parts of gum elemi, and a few grains of euphorbium to the ointment, is then the beſt that can be done.

CHAP. XXI.

Of the garget.

THIS is a diſorder of the outward parts of the head, attended with ſwelling and inflammation; which frequently ſpreads into the mouth, and ſometimes into the throat, and down to the inteſtines. In this laſt caſe it is properly the murrain, though it begun with the garget. The garget is *the ſwelling of the head, eyes, and lips, extending itſelf to the gums and tongue, but no farther:* when it goes farther it acquires another name.

The moſt uſual cauſe of the garget is *bad water*; but the extreme degree of it and of the murrain often ariſe from an infectious ſtate of the air. When the farmer ſees an ox or cow affected with a ſwelling in the head, diſcovering itſelf about the eyes, the firſt thing is to examine the lips; if they are ſwelled, he muſt look into the mouth and examine the tongue. If the eyes, lips, and whole outſide of the head be effected, and nothing more, the remedy is as follows.

Firſt let the creature be blooded very largely; and immediately after give the following mixture. Heat a quart of ale, and diſſolve in it three quarters of an ounce of mithridate; add ten grains of ſaffron, and a tea ſpoonful of ſpirit of nitre: give this every ſix hours, and obſerve whether the ſwelling about the eyes decreaſes: this is the great ſymptom by which to know whether the medicine takes effect. Give the drink warm, and, as much as the creature pleaſes.

If the ſwelling continues, eſpecially if it encreaſes, bleed again more largely than before; and give three ounces of Glauber's ſalt diſſolved in water. This will purge briſkly; and by this change of the remedies there is a fair chance for a cure. If theſe methods fail at firſt, continue them interchangeably, till there is an amendment or death.

The next ſtage of this diſeaſe, is that in which the inſide of the lips and the tongue are affected. This is ſtill the garget, provided the outſide of the head be affected alſo; but if otherwiſe it is the murrain, though in a leſs degree.

If the farmer firſt perceive the outſide of the head ſwell, let him examine within the mouth, to know whether it have ſpread ſo far: and if he firſt perceive the diſorder in the mouth, let him examine the head on the outſide, to diſtinguiſh whether it be the garget, or the firſt ſtage of the murrain. We here ſuppoſe it the firſt of theſe caſes; and that he finds the eyes ſtarting, enflamed and ſwelled; the lips hot and ſwelled; and perhaps the under part of the neck: he will alſo perceive the tongue very much diſordered. This in the preſent caſe is a very eſſential point; for the tongue is uſually the principal ſeat of the diſtemper.

Let the upper and under ſide of the tongue be ſearched carefully, and probably there will be found bliſters on the top or ſides; or a lodgment of matter under it; ſometimes both. Theſe bliſters muſt be cut, and the point of a lancet or fine knife muſt be thruſt into the ſore or ſwelled part underneath. This done, the tongue is to be waſhed ſeveral times with ſharp vinegar mixed with ſalt, and rubbed with a clean cloth: by this means the foul and offenſive matter will be let out. Then the creature muſt be kept to the following courſe of medicines.

Firſt let him be largely blooded. Then mix together a pint of ale, three quarters of an ounce of venice treacle, a quarter of an ounce of anniſeeds in powder, and two ſpoonfuls of the juice of rue: this is all to be heated and given at a doſe; and it muſt be repeated morning, noon, and night. Let the creature be kept warm, and let his drink be water, that has been poured boiling upon a good quantity of the herb agrimony, and let him have it warm.

CHAP. XXII.

Of the murrain.

THE murrain is the higheſt degree of theſe diſtempers: what we call the diſtemper among the horned cattle at this time, is the murrain diſtinctly and properly ſo named. It is an inflammation of the whole paſſage through the body from the mouth to the fartheſt extremity of the guts; and it is attended with a very bad ſtate of the blood. This diſeaſe ſometimes ariſes from very unfavourable weather; the drinking bad water, and being reduced to feed upon coarſe graſs: but the general origin of it is in the air. Some cattle are, by the ſtate of their blood and humours at that time, more expoſed to receive the peſtilential vapours than others; but all are expoſed to it: and when it has once taken place, it ſpreads by abſolute and plain contagion.

This is the cauſe of its being terribly deſtructive in ſome counties, and ſcarce appearing at all in others: and to this it is owing, that wherever it gets footing it ſpreads and continues.

There is no wonder that creatures ſtanding near one another receive the contagion with the breath: eſpecially as the temperature of the air favours the ſpreading. Upon this principle we ſee the wiſdom of the legiſlature, in forbidding cattle from infected places to be brought into counties where the diſeaſe is not; and this gives the farmer the firſt hint of his proper conduct.

duct. As ſoon as he perceives this diſorder upon any one of his cattle, let him ſeparate that from the reſt, and take care of all.

The firſt ſtep is to bleed largely; and this ſhould be extended to the ſick and the well. In reſpect to the ſick, it is the proper ſtep to abate the inflammation; and as to the reſt it may be ſufficient to prevent the breaking out of the diſeaſe upon ſuch as would otherwiſe have had it, from ſome ſlight infection communicated before the ſeparation of the ſick: or if it do break out upon them, they will have it more favourably.

The cattle ſeparated by way of preſervation need no farther care after bleeding; unleſs the diſeaſe appear upon any of them. In that caſe ſuch are to be ſeparated from the reſt. As ſoon as they have been blooded, let a quantity of vinegar be made hot, and a little ſalt diſſolved in it; and with that let their tongues, mouths, lips, and teeth be thoroughly waſhed.

Beat in a marble mortar half a dozen large heads of garlick: preſs out the juice, and add to it an equal quantity of tincture of myrrh. Set on half a pint of ale to be hot, and put to it a quarter of a pint of this mixture. When it is all hot together pour in two ſpoonfuls of tar, and then immediately give it to the creature. The tar will not mix with the reſt, but it will go down with them. Let this be repeated once in four hours; and if there be no amendment the firſt day, let the creature be blooded again the day following, and the ſame courſe continued.

I have ſeen many other medicines tried, indeed almoſt innumerable; for of all herbs and drugs that the old woman and the doctor have ever recommended in peſtilential diſtempers, not one has been omitted on this occaſion. The diſeaſe is in itſelf ſo terrible, that it would be falſhood and folly to boaſt of vaſt ſucceſs from any: but this we can aſſure the farmer, that of all the medicines that have come to our knowledge this has ſucceeded beſt.

Beſide the value of this as a remedy, there is nothing ſo good as a preſervative. For this reaſon, when ſome cattle of the farmers are taken ill, and are ſeparated from the reſt; and when, one after another, ſeveral of thoſe ſet apart fall into it, the whole number of them ſhould be preſerved if poſſible from the ſame fate, by taking largely of this medicine. They ſhould all have a doſe night and morning for ten days after their ſeparation from the ſick.

BOOK XIII. SECT III.

Of the diſeaſes of SHEEP.

Chap.
1. *Of a fever.*
2. *Of a purging.*
3. *Of the tag.*
4. *Of diſorders of the lungs.*
5. *Of the jaundice.*
6. *Of ſtoppages in the throat.*
7. *Of ſturdyneſs.*
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Chap.
9. *Of the ſtaggers.*
10. *Of the ſcab.*
11. *Of the red-water.*
12. *Of the foot-worm.*
13. *Of the wild-fire.*
14. *Of diſorders of the eyes.*
15. *Of the dropſy.*
16. *Of the rot.*

The INTRODUCTION.

THE diſorders of ſheep, though not ſo numerous as thoſe of larger cattle, yet are ſuch as it imports the farmer as well to underſtand; for they are as fatal, and ſome of them as difficult of cure.

CHAP. I.

Of the fever.

THE fever in ſheep is an inflamed ſtate of the blood, diſordering the eyes and mouth, and affecting the whole body, though not ſo viſibly. When the ſigns of a feveriſh diſpoſition appear, the farmer muſt feel their feet; if they are hot, he may be ſure he has gueſs'd right as to the diſtemper; this is a needful caution, becauſe there are other diſorders that will give an inflamed look to the eyes and mouth.

The diſeaſe is often deſtructive in itſelf; and frequently it brings on other fatal diſorders. The cauſe is generally cold. When only two or three are affected by it, the caſe is leſs deſperate; but when many together, it is always the more fatal.

The firſt thing is, to keep the ſheep in a warmer and more ſheltered place. In the heat of ſummer the weaker among the flock will be ſometimes rendered feveriſh, only by being expoſed too much to the ſun: and in this caſe he muſt drive them to a cool ſhelter: in either condition they muſt be kept quiet, and muſt have wholeſome ſweet graſs and freſh water. Then the following remedies will take place:

Firſt bleed the ſheep, and afterwards give to each the following medicine with a horn. Heat a quart of ale, and diſſolve in it an ounce of mithridate; add half an ounce of Virginian ſnake-root, and one dram of cochineal in powder. This quantity ſerves for four doſes, and one of them is to be given night and morning. If the ſheep be bound in its body, an ounce of lenitive electuary is to be mixed with each doſe; but if looſer than ordinary, that is not to be regarded during the courſe of the remedies, for it will contribute to the cure. The four doſes uſually are ſufficient.

CHAP. II.

For a purging.

LEAVE nature to her courſe when a purging comes on, with a fever, in ſheep; but when the fever is abated, the purging muſt be ſtopp'd; and the ſame remedy that anſwers for this purpoſe, may be given for ſuch purgings as come on of themſelves.

Boil a quarter of a pound of raſpings of logwood in two quarts of water, till but a quart is left; when it is near done, put in a ſtick of cinnamon: Strain it off, and give the ſheep a quarter of a pint of it, with a horn, four times a day, till the purging ceaſes. If this does not ſtay the diſorder, the following addition will render it ſure of ſucceſs. To every doſe of this add a quarter of an ounce of diaſcordium without honey, and ten grains of Japan earth powdered; give the doſes only morning and night.

CHAP. III.

Of the tag.

THIS is an external diſorder, owing to the complaint laſt named. It is a diſtemperature of the tail beginning with filth and foulneſs, and ending in ulceration.

The tag is ſituated in the inner part of the tail: it conſiſts of ſcabs and ſores, very painful and waſting to the creature; and is owing to the fouling of this part by a purging. That tag is worſt which follows a fever, becauſe the inflamed ſtate of the blood tends to encreaſe the diſorder; and when it begins, during the continuance of the diſeaſe, the matter of the fever may chance to ſettle there. Two things are to be done; the firſt is, to ſtop the purging; and the other, to clean the tail.

The laſt mentioned remedy, either in its weaker or ſtronger form, is to be uſed to ſtop the purging; and the tail being clipp'd, and the ſore part laid bare, firſt waſh it carefully with milk and water blood-warm, and then with lime-water. After this turn the ſheep looſe into a clean dry paſture. Two days after look at it again, and, if not well, repeat the waſhing, and anoint it with greaſe and tar mixed together. Twice doing of this is generally ſufficient for the compleating of a cure.

CHAP.

CHAP. IV.

Of the diſorders of the lungs.

SHEEP are ſubject to be diſordered in the lungs, which is eaſily perceived in their breathing or by their coughing: nothing requires a more ſpeedy remedy; for they grow incurable when it is neglected but a little time; and die as men in a conſumption. Change of air and paſture are eſſential to the cure; without this no remedies will take place: with it the following rarely fails.

This diſorder is owing to cold; and it generally comes upon ſheep that have been kept in low grounds in wet weather.

Drive them into an encloſed paſture where there is ſhort graſs and a gravelly ſoil; and where there is ſpring or other running water. Bruiſe a baſket-full of the leaves of colt's-foot, and preſs out the juice. Bruiſe an equal quantity of plantain, leaves and roots together, and preſs out its juice. Mix theſe, and bruiſe as much garlick as will yield about a fourth part as much juice as one of the others. Mix all together, and add to them a pound of honey, an ounce of powdered aniſeeds, and an ounce and half of powdered elecampane; give a quarter of a pint of this warm, to every ſheep that is affected, once in a day, and it will by degrees make a perfect cure.

CHAP. V.

Of the jaundice.

SHEEP are more ſubject than any animal to obſtructions of the liver; and this is ſeen in a yellowneſs of the eyes, and a tinct of the ſame kind in the ſkin, when carefully examined. Our farmers, in ſome places, call this the choler; or, as they ſpeak it, the colour.

Drive the ſheep that are affected into an open paſture; and let the perſon who has the care of them, keep them often in motion, but not fatigue them; then prepare the following remedy. Boil in four gallons of water two pound of fennel roots, the ſame quantity of parſley roots, and twice as much roots of couch-graſs, all cut ſmall; when the water is very ſtrong of them, and there is about half the quantity left, ſtrain it off, preſſing it hard. Bruiſe as much great celandine as will yield three pints of juice, add this to the liquor, and laſtly put in three drams of ſalt of ſteel. Mix all together, and every day heat ſo much of it as will ſerve to give every one of the ſheep that is ill a gill and half for a doſe. This, with the forementioned directions, rarely fails of a cure.

CHAP. VI.

Of ſtoppages in the throat.

SHEEP affected with this, wheaze and breathe with difficulty. It commonly ariſes from bad paſturage and colds. The remedy is this: drive them into a higher ground and keep them warm; then give the following medicine. Bruiſe a good quantity of penny-royal, and ſqueeze out the juice. Put to a quart of this a pound of honey, and half a pint of ſharp vinegar. Give the ſheep half a pint of this, bloodwarm, every night.

Penny-royal is, by ſome, delivered as a remedy for all diſorders of ſheep; but this is erroneous: nothing has been hitherto ſo little underſtood as the medicines proper for cattle. What are here delivered, are, in general, ſupported by experience; and that phyſician who has judgment to propoſe more, and patience to ſee them try'd fairly; to approve and eſtabliſh the beſt, alter and amend the others; and finally to publiſh the reſult of all, will deſerve a ſtatue, for the good done to his country, more than all her heroes.

CHAP. VII.

Of ſturdyneſs.

THIS is a giddineſs in the head in ſheep. It riſes principally from very rich feeding. The cure is this.

Bleed the ſheep largely, then give the following draught. Bruiſe ſome roots of wild valerian, ſqueeze out the juice, heat it, and give a quarter of a pint. Repeat this once in four hours. When the ſheep is recovered, turn it upon the common, or into ſome barren hilly paſture; it will be kept from relapſes by having but little food, and that perfectly wholeſome. If this diſeaſe returns it is commonly fatal.

CHAP. VIII.

Of the wood evil.

THIS diſorder is a kind of cramp: it ſeizes the legs of ſheep, and will often affect a whole flock at one. The cauſe is cold and wet. The lying under the drip of trees in rainy ſeaſons has often occaſioned it, and thence it got the name of the wood evil.

The firſt care is to remove the ſheep into a dry paſture, and then proper remedies may take effect. Boil in a large quantity of ale as much common cinquefoil and hedge muſtard as can well be ſtir'd into it. When the liquor is very ſtrong, ſtrain it off, and add a pint of juice of valerian root to every gallon. Give the ſheep half a pint of this, in a horn, morning and night. Boil in vinegar a large quantity of the leaves of hedge-muſtard, and with this liquor, hot, rub the legs of the ſheep.

CHAP. IX.

Of the ſtaggers.

SHEEP have this diſorder as well as horſes, and it ariſes from improper food. They crop the young ſhoots of ſhrubs; and though many of theſe are wholeſome, ſome are hurtful. Eating the oak leaves and buds is particularly prejudicial; it binds them in the bowels, and frequently the ſtaggers follow. The ſymptoms are like thoſe of the ſturdyneſs, but more violent; and there is generally a trembling, at the ſame time, in all the limbs.

Diſſolve an ounce of aſſafœtida in two quarts of water. Give the ſheep a quarter of a pint of this, warm, every three hours; it commonly opens their bowels at the ſame time that it takes immediate effect upon the nervous diſorder, and thus performs a perfect cure. Some of our farmers put the aſſafœtida into the ears of the ſheep; but that is an idle practice. Medicines are eaſily given them inwardly with a horn, and there is no other way in which any dependance can be placed upon them. When the ſheep are recovered, let them be kept out of the way of a return to the ſame food, and they will be in no danger of a relapſe.

The farmer will ſee by the ſeveral accounts of theſe moſt ordinary diſeaſes incident to ſheep, that they are not ſo ſubject to them as many other creatures, from unknown cauſes, but fall into them principally from a bad method of keeping. In general, low grounds are the moſt unwholſome; for they abound with wet, and give birth to many weeds of a poiſonous nature not found in others. Woods alſo are diſadvantageous on many accounts: therefore let him be careful of his feeding, and he will have leſs to fear on account of diſorders in this kind; and when they ſo happen, they will be lighter and more eaſily remedy'd.

CHAP. X.

Of the ſcab.

THIS is a diſorder to which ſheep are very liable; but as many of the others, ariſe oftener from ill management than any natural cauſe, ſo this more than any. Sheep kept on downs, or in dry wholſome paſtures, are very little liable to it; thoſe which lie wet, or get under droppings of trees in bad ſeaſons, are frequently affected by it in the ſevereſt manner.

When the wet falls upon their ſkins, and they are heated afterwards; eſpecially when they lie under trees, and the wet falls upon them from the branches, their ſkins grow ſcurfy, and in a little time there riſe ſcabs in various parts; upon this the wool grows looſe, and the ſheep pine and become lean.

If it be a ſeaſon for ſhearing, or if that can be done with propriety, nothing is ſo good a ſtep to the cure: if not, the ſame remedies muſt be applied without: cleanlineſs is the great article; and it is in vain to begin a cure without it. They muſt be waſhed in the foul places with ſoap-ſuds, made very ſtrong, and uſed warm with a flannel or bruſh. After this they muſt be turned looſe into a clean paſture, and driven up again as ſoon as well dry'd, and all the ſore parts muſt be well wetted with lime-water. The ſcurfy parts of the ſkin muſt be regarded; and the doing this three times, at two days diſtance each, will be a remedy.

If this fail, the parts that have been thus waſhed and cleaned, muſt be anointed with a mixture of equal parts of tar and greaſe, and they will ſoon be perfectly well. No inward medicines are required, for the complaint is only on the ſkin.

CHAP. XI.

Of the red water.

FARMERS do not ſeem well to underſtand themſelves in reſpect of this diſorder; but in ſome places call an inward diſeaſe, and in others an outward one, by this name. The laſt is the proper meaning of the word. Though it appears outwardly it is not entirely of the external kind, as the former: the blood is always more or leſs affected with it, and care muſt be taken, by inward as well as outward medicines, in the cure.

The great miſtake has been the attempting it by outward remedies alone. The appearance of the diſorder is about the breaſt and belly, but it will ſpread itſelf to other parts. It is an inflammation of the ſkin that often raiſes it into bliſters, and in thoſe is contained a ſharp humour, thin, watery, and coloured with blood. Nothing muſt be done to ſtrike it in, but the cure regularly attempted by amending the bad ſtate of the blood.

The ſheep that are affected with it, muſt be ſeparated, or otherwiſe it will be very apt to ſpread; and they muſt be put where there is ſweet graſs and good water.

Mix half an ounce of flour of brimſtone with an ounce of honey; work it well together, and then divide it into two parts. Diſſolve one of theſe in half a pint of juice of nettles, and give it every day for a fortnight. Slit the bliſters when they are full of this watery humour, and having let the matter out, wet the place with juice of wormwood. After four days of this courſe, bleed them; and then continue the ſame method till they are well.

CHAP. XII.

Of the foot-worm.

SHEEP are liable to breed worms between their feet; principally when they are kep in wet paſtures. It is very painful to them, and will make them pine away. It is perceived by their frequent holding up one foot; and by their ſetting it tenderly down.

Let the foot be waſhed clean, particularly between the toes, and there will be ſeen a little lump like a tuft of hair. This is the head of the worm. It is to be taken out with care, for 'tis of a tender ſubſtance, and if it be broke in the foot it will occaſion an inflammation. The beſt method is to open the fleſh on each ſide of it, and then, by means of a pair of knippers, to take it out. Dreſs the wound with tar and greaſe melted together in equal quantities, aud turn the ſheep looſe. It is better to put it into a freſh paſture; for if the ſame diſorder returns, it is generally worſe.

CHAP. XIII.

Of the wild-fire.

THIS is a violent inflammation, in the manner of a ſaint Anthony's fire, upon the ſkin of the ſheep, in different places; and generally infects the whole flock. Our forefathers buryed the ſheep alive with its feet upwards at the door of the fold; and ſuppoſed this acted as a ſpell to drive away the diſeaſe. We do not inherit theſe errors. The method to be obſerved is this.

Such ſheep as are infected are to be ſeparated from the reſt. Then bleed them, and prepare the following external remedy. Bruiſe the leaves of wild chervill, and add to them as much lime-water as will make the whole very ſoft. When it is beat up together, add as much powder of fenugreek-ſeed as will reduce it to pap; then put it into a pan, and ſet it in a cool place. Rub the inflamed part carefully with this every evening, and make as much lie on as can be kept there; it will take effect during the time of reſt, and is to be repeated as long as there is occaſion.

CHAP. XIV.

Of diſorders of the eyes.

SHEEP are often affected with colds falling upon their eyes, and almoſt blinding them; and, at other times, the ſame accidents ariſe without any viſible cauſe. The remedy in either caſe is the ſame. Preſs out the juice of great celandine, and drop a quantity of it into the eyes night and morning.

CHAP. XV.

Of the dropſy.

SHEEP are often ſwelled with water in their bellies; and this, if not regarded in time, is certain deſtruction. There are two ways in which it is lodged; the one is between the outward fleſh and the rim; the other within the rim. In the firſt caſe, the cure is eaſy; in the other, nothing can be done.

The method, in the firſt caſe, is by a coarſe kind of tapping. An opening is to be made in the fleſh, and a quill thruſt in; this will give the water a free paſſage out, and the wound heals of itſelf: but when the creature is emaciated, nature will not have ſtrength to heal it: in that caſe, the ſheep is to be examined daily, and the wound dreſſed with greaſe and tar. The creature muſt be put into a freſh, dry, and wholeſome paſture, and then diſpoſed of as ſoon as recruited; for this is a diſorder that never fails to return upon any miſmanagement in keeping.

CHAP. XVI.

Of the rot.

THE rot among ſheep is the moſt deſtructive of all diſorders. It is contagious, like the murrain. It uſually ſpreads through the whole flock; and often over the neighbouring country. Preſervation from it is of as much importance as its cure; indeed of more, becauſe the cure is very uncertain. Sheep that feed at large upon open commons, are more ſubject to it than ſuch as have ſhelter, and are taken care of at nights: thoſe which feed in the dampeſt grounds, are moſt ſubject to it; and it frequently ariſes from a cold ſeaſon and dribbling rains coming on ſoon after the ſhearing. Laſtly, want of food will occaſion the ſame diſeaſe; and the eating ſuch graſs as is full of unwholeſome plants.

Such are the cauſes in many places; but the worſt and moſt common is infection. Keep ſheep out of the way of theſe cauſes of the rot; and the ſame care will preſerve them from moſt other diſorders: when the diſtemper is any where near

him,

him, let the farmer be careful to keep them clear and diſtant from all others. Damp grounds are always dangerous; and in wet ſeaſons eſpecially.

In ſuch times, the beſt practice is quickly to remove the flock to the upland paſtures, and to give them hay as a part of their food. 'Tis a happineſs to diſcover the diſeaſe in time. The firſt notice of it will be perceived in the eyes; and therefore in a wet ſeaſon, and eſpecially at a time when the rot is among the neighbouring ſheep, let him look into that part. When a ſheep is infected, the white of the eyes looks dull, and they have a faint aſpect; the creature is feeble, and his ſkin is foul: the wool comes off in handfuls with the leaſt touch; and the gums look pale and the teeth foul. He will be dull and liſtleſs in motion; and heavy, as if his legs were not able to carry him.

Many are generally infected at a time, and the firſt care muſt be to remove them from among the ſound ones: and put them up in a cloſe fold. They muſt have little water; and their food muſt be dry hay and oats. The beſt way of giving theſe, is in troughs placed round the fold.

Bleeding is deſtructive in the rot.

Sheep fed in ſalt marſhes never have the rot. This put it into people's thoughts to try ſalt as a cure; and we read wonders of its effects. I have ſeen it tryed, and ſometimes with good conſequences; but never with the great ſucceſs that is boaſted. Salt is a preſervative againſt the rot; but it is not ſo certain a cure.

The beſt is bay ſalt; and the beſt way of giving it, is by beating it to powder, and then ſprinkling it among the dry food. Though we do not adviſe the farmer to rely upon it entirely, we ſhall recommend it among other remedies.

Bruiſe an ounce of grains of paradiſe, and four ounces of juniper-berries dry'd; add to theſe two pounds of bay-ſalt and half a pound of loaf ſugar, grind them all well together, and ſprinkle ſome of this upon the hay and the oats that are given the ſheep, Let this be continued three days, and look from time to time into the eyes, and examine every other way, to ſee whether they mend or grow worſe. If there be ſigns of amendment, let the ſame courſe be continued: if not, the following muſt be uſed. Steep four pounds of antimony in two gallons of ale, for a week; then give the ſheep this every night and morning, a quarter of a pint at a time.

Boil a pound of the roots of avens, and two pounds of the root of maſter-wort, in two gallons of water, till there is not more than ſix quarts remaining: ſtrain this off, and preſs it hard;

then pour a pint of it into a pail-full of water that is to be given to the ſheep for their drink.

By theſe means, carefully managed, and under a good regulation in cleanneſs, dryneſs, and warmth, the rot will be often cured: this is all that can be promiſed; for there are times when the diſeaſe is ſo rooted, and when the temperature of the air ſo favours it, that nothing will get the better of its violence. If the ſheep have a diſtaſte to their food, becauſe of the ſalt and other ingredients mixed among it, they muſt be omitted for two or three feedings; and then given in leſs quantities.

BOOK XIII. SECT. IV.

Of the diſorders of HOGS.

Chap.
1. *Of the fever.*
2. *Of the murrain.*
3. *Of the jaundice.*
4. *Of ſickneſs at the ſtomach.*
5. *Of the meaſles.*
6. *Of the lethargy.*
7. *Of the ſwelling of the milt.*

Chap.
8. *Of a purging.*
9. *Of impoſthumations and boils.*
10. *Of foulneſs of the ſkin.*
11. *Of ſore ears.*
12. *Of the pox.*

The INTRODUCTION.

THE hog is not without its diſorders, though they are not ſo many as thoſe which attend ſheep. We ſhall not leave the farmer uninſtructed in any thing that concerns his intereſt; wherefore we name them here, and ſhall deliver the ſymptoms by which they are known; and the approved remedies.

CHAP. I.

Of a fever.

A Fever is common among cattle of moſt kinds; and the hog is not exempt from it. The firſt ſymptom of it is his forſaking his food. The hog has a ravenous appetite from nature, and when he loſes it ſomething is much amiſs. He will ſoon after droop and grow faint, and if not taken care of will pine in his fleſh, and the diſorder will end in his deſtruction.

The firſt ſtep is bleeding, and the beſt place is behind the ears. If this part do not bleed freely, his tail is to be cut; and between one and the other there will be got enough. A pint is a proper quantity.

After bleeding put him up warm, and give him a good hot meſs made of raſpings of bread, broth, and ſome chopped penny-royal. As ſoon as he has well taſted this take it away. This will make him ravenous, and he will ſwallow it with the addition of a medicine, which he would not have done before. This muſt be philonium romanum. Half an ounce of it muſt be put into a gallon of the meſs, and he muſt eat a little at a time. If he take above half he will have an over doſe: therefore it muſt be taken away; and eight hours he muſt be kept without any thing elſe. This will make him ready to take the remainder; and that probably will make a perfect cure.

CHAP. II.

Of the murrain.

THIS is as fatal to hogs, as other creatures. It is owing to bad food; and diſcovers itſelf by the waterineſs of the eyes, and by the hanging of the head to one ſide: the creature alſo is weak, faint, and refuſes its victuals.

Make a very good warm maſh; and let the hogs be kept all the afternoon and all the night faſting before it is ſet before them. Put into it half a pound of grey ground liver-wort, and the bigneſs of an egg of red oaker, with as much ſalt-petre as will lie upon a ſhilling, powdered. The hog will generally be tempted to eat ſome of this after ſo much faſting. When he leaves off, if he have ſwallowed ever ſo little, take it away.

Four or five hours after ſet it before him again, and he will eat more; and by this means he will be brought to his ſtomach. All his food muſt have a little ſalt-petre and a good quantity of liver-wort in it. This will take effect, if he be within the reach of remedy: but it is a diſeaſe that is very often fatal. Cleanlineſs and good management muſt aſſiſt, or no medicines will do.

CHAP. III.

Of the jaundice.

THE hog is ſubject to an overflowing of the gall, which ſhews itſelf by a yellowneſs of the eyes and about the lips, and by a ſwelling under the jaws. Bruiſe great celandine, and preſs out the juice; add to it one fourth part the quantity of vinegar. Bruiſe a good quantity of wood-lice, and when all is ready make a hot maſh: into as much of this as the hog will eat at a time, put a pint of the juice and vinegar, and about a quarter of a pound of the bruiſed wood-lice.

Let him faſt three hours before he has this, and ſix hours after it. He will like the maſh the better for theſe ingredients.

If his ſtomach be ſo bad that he will not eat it all at once, it muſt be taken from him as ſoon as he ſhews a diſtaſte, and ſet before him again half an hour after. A hog will thus be led to eat almoſt under any ſickneſs: and this is the true method of curing his diſorders.

CHAP. IV.

For ſickneſs at the ſtomach.

THE hog, though his ſtomach is naturally very ſtrong, is ſubject to ſickneſs, and will caſt up his food. This will encreaſe upon him, and he will waſte away. The cure is by a change in his food; or if it be neceſſary the addition of a medicine with it: but the firſt uſually anſwers.

Keep him from all coarſe meats, and give him beans with a little water. If this anſwer alone, it is better than giving medicines: if it do not, give him every day among his food half an ounce of mithridate. It will at the ſame time warm and ſtrengthen his ſtomach; and he muſt be kept to good food for fear of a relapſe.

CHAP. V.

Of the meaſles.

THIS is a common diſorder among hogs, and ſhews itſelf in a redneſs of the eyes, and foulneſs of the ſkin, and in their neglecting their food.

Keep the hog faſting the whole afternoon and night. Then ſet before him a good meſs of victuals; not large in quantity, but hot and well prepared, and put into it forty grains of ſalt of hartſhorn and two ounces of bole armenick. It will all go down very well after this faſt: the ſame method is to be followed every day till he is perfectly recovered, and for a few days after, for fear of returns.

CHAP. VI.

Of the lethargy.

THE hog will ſometimes fall into the ſleeping-evil or lethargy. He will doze all day long, neglect his food, and pine away. The remedy is a vomit; and the beſt is this.

Gather a good quantity of wall pepper, bruiſe this in a marble mortar, and preſs out the juice. Keep the creature faſting all the afternoon and night, and in the morning ſet before him a warm meſs, into which put a pint of the juice of the ſtone crop. He will be tempted to eat by his long faſt; and the hog is not very curious about taſtes. He will vomit ſoon after

ter he has ſwallowed it; and that ſingle doſe will frequently prove a cure. If this be not ſufficient it muſt be repeated next day.

CHAP. VII.

Of the ſwelling of the milt.

WHEN a hog is giddy, and runs principally on one ſide, the farmer is to underſtand that it is his milt that is diſordered; and if he be not relieved he will forſake his food, and pine to death. The uſual cauſe of the diſorder is a ſurfeit in feeding upon maſt.

The cure is this. Bruiſe a good quantity of the leaves and tops of common wormwood, and preſs out the juice: add to this ſome juice of penny-royal, and give the hog a pint of it in every meſs of his victuals till he is perfectly recovered; which will be known by the ſteadineſs of his walk and his quietneſs.

CHAP. VIII.

For a purging.

HOGS that are taken with a flux often have it to a great violence, and waſte with it till they are only ſkin and bone. It riſes from bad food. The cure is this. Make a good meſs of food for him, and put into it half a pound of acorn huſks. Obſerve whether he grow better. If he do, repeat the ſame method till he is perfectly cured.

If this do not ſucceed, give him in every meſs of his food a handful of tormentill roots chopped ſmall. This ſcarce ever fails of compleating the cure.

CHAP. IX.

Of impoſthumes or boils.

HOGS are ſubject to boils and hard ſwellings in various parts; and the beſt method is to open them, and let out the matter at a proper time. A common knife anſwers this purpoſe. The farmer muſt watch for their growing ſoft, that being the mark that they are in a condition to be cut. He is then to lay the boil open the whole length, and preſs it on the ſides to get out the matter; and when this is done he muſt anoint the place with greaſe and tar, and it will heal preſently.

CHAP. X.

Of foulneſs of the ſkin.

THE hog is naturally uncleanly, and the farmer muſt take the more care in his management. A wet ſtye will ſubject him to colds and fevers: but if it be wet and naſty together, the firſt conſequence will be a foulneſs, ſcurf, and ſcabbineſs of the ſkin. The hog will pine, and all his meat will be thrown away upon him, unleſs this be cured. The blood is often in fault in theſe foulneſſes, and then inward remedies are needful: the others may be tried firſt, and if they do not take effect, that is a proof theſe are wanted.

Firſt bleed the hog under the tail, as much as can be well got away: it ought to be a pint at leaſt. Then prepare ſome very ſtrong ſoap ſuds. Rub common ſoft ſoap upon a ſcrubbing bruſh, dip it in the ſuds, and ſcrub the hog well all over. After this waſh him well with warm lime water, and make the ſtye clean; give him dry litter and wholeſome food, and after two days clean him again, and rub him with lime water.

If this do not make a cure his blood is infected; and flower of brimſtone muſt be put into his victuals in large quantities. This, with the repetition of the other will cure. If the ſkin be broken in any place it muſt be dreſſed with tar and greaſe; and when he takes the brimſtone inwardly, ſome ſhould alſo be mixed in ointment.

CHAP. XI.

For ſore ears.

SOMETIMES the hog will have a ſoreneſs about the ears from dirt and filth: more frequently it riſes from the teeth of dogs; and the worſt is when both cauſes come together. The dogs make the hurts; and the dirt occaſions them to feſter.

Warm ſome vinegar, and waſh the ears thoroughly till they are clean; then make an ointment of tar and greaſe in equal quantities, and add a little common ſoap. Rub the ſore parts with this, and repeat it till the cure is perfected.

CHAP. XII.

Of the pox.

THIS is a diſorder that ſhews itſelf outwardly in pimples and blotches; keeps the creatures miſerable, and makes them pine and waſte. It riſes from wet and filth in their ſtyes, and from unwholeſome food.

Make a hot meſs, and give in it an ounce of venice treacle. After this let the whole ſkin be cleaned with ſoap ſuds, and wherever the ſores and pimples are, uſe the following ointment. Melt two pounds of hog's lard, and ſtir in half a pint of tar. When it is taken off the fire, put to it as much flower of brimſtone as will thicken it when cold into a firm ointment. Rub this upon the hog every night for four times, and keep him dry and clean: it will commonly make a cure in that time.

This diſeaſe is infectious. The farmer muſt ſeparate thoſe which have it from the reſt, and not put them together again till they have been ſome time well, and he ſees there is no return of the diſorder.

BOOK XIII. SECT. V.

Of the diſorders of POULTRY.

Chap.
1. *Of the pip.*
2. *Of the roup.*
3. *Of the flux.*
4. *Of ſtoppage of ſtools.*
5. *Of ſore eyes.*
6. *Of vermin upon poultry.*
7. *Of ſores.*

The INTRODUCTION.

THESE animals have their diſorders like others; and their remedies are as efficacious and certain. The farmer will the eaſier be a maſter of this part of his care, becauſe there is not ſo great difference between one kind of poultry and another, that there is between one kind and another of the four-footed animals. Their diſtempers are the ſame in general, and the ſame remedies will cure them.

CHAP. I.

Of the pip.

THIS is peculiar to young fowls, and ariſes from want of water. The natural moiſture of the mouth hardens upon the end of the tongue into a kind of ſcale, and this prevents their feeding. The great care is to obſerve in time which have the diſeaſe, for the remedy is eaſy.

Let ſome bay ſalt be melted in a little vinegar and ſet in a ſaucer. Let the young creatures be taken up and the ſcale looſened, and then pulled off from the tongue with the fingers. Then wet the end of the tongue two or three times over with the vinegar and ſalt, and turn the chick looſe where he cannot drink for an hour.

CHAP. II.

Of the roup.

THIS is a ſmall ſwelling of an inflamed kind upon the rump. The fowls that have it grow ſickly; their feathers ſtand rough, and they pine. When they are ſeen in this condition, let the farmer ſeek for the ſwelling and open it with a knife. Let him ſqueeze out the matter, and then waſh the part with hot vinegar and turn the fowl looſe.

CHAP. III.

Of the flux.

NO kind of poultry can thrive, unleſs they are properly in order with reſpect to their excrements; and wrong food will throw them into diſorders in either extream. This of the flux is always occaſioned by their eating too great a quantity of moiſt food. The beſt remedy is to give them ſuch victuals for ſome days as tends to the other extream: and if this fails, to have recourſe to more powerful things. Bran ſcalded is a food they will eat very freely; and it will commonly very well anſwer the purpoſe. If this does not ſet them right in two days, rub to powder ſome dry roots of tormentil and mix with it: this never fails; and they preſently grow well and hearty.

CHAP. IV.

Of ſtoppage of the ſtools.

THIS is the contrary extream, and is owing to eating too much dry and binding meat. It renders their excrements hard, and prevents their voiding them freely.

The firſt attempt to a remedy ſhould be by the food; and if that fail medicines muſt be added. Thoſe cures performed by a change of diet are always more natural and more laſting. Give them bread ſoaked in broth; and if that fails, add to the meſs a ſmall quantity of manna: ſkim off the fatteſt part of ſome liquor in which meat has been boiled, diſſolve in half a pint of this two ounces of ordinary manna, and then put in ſome bread to ſoak. They will eat this very freely, and it will certainly cure them.

CHAP. V.

Of ſore eyes.

THIS complaint is common among poultry, and it is eaſily remedied. Their eyes are often hurt by accident in their going among briars, and by their pecking one another; and they are alſo ſubject to ſwell and inflame with colds. Theſe diſorders ſhew themſelves in various parts of the eyes and eye-lids; but one remedy ſerves for them all.

Gather equal quantities of celandine, ground ivy, and clown's wound-wort. Bruiſe them in a marble mortar, and preſs out the juice. Add to half a pint of this four ſpoonfuls of white wine, and dipping a pencil-bruſh in it, rub the eye-lids and eyes carefully every morning and evening.

CHAP. VI.

Of vermin upon poultry.

WHEN fowls are kept in a yard they have not always opportunities of cleanlineſs, and whenever it is omitted they ſuffer. Their feathers keep their ſkin ſo warm, that it is a natural place for the breeding of vermin; and, every kind of fowl, as well as every ſpecies of beaſt, the eagle and the lion not excepted, have their louſe, which will be ſure to appear when uncleanlineſs encourages it. The means of cleanneſs are plenty of water and dry ground; the fowls will waſh themſelves in the one, and rub themſelves in the other; and thus keeping clean they are free from vermin: but when they have foul water it ſticks to their ſkins, and gives filth inſtead of cleaning it away.

To prevent this evil, let the farmer take care there be good water; and a dry ſoil in ſome part of the yard. When it is come on the remedy is this. Boil a quarter of a pound of white hellebore root ſliced in two quarts of water to a pint and a half. Strain this off, put it into a quart bottle, and put to it an ounce of beaten pepper, and half an ounce of Scotch ſnuff. Waſh the ſkin where the vermin are with this, and it will prove a certain and ſpeedy cure. But if they be not thoroughly killed they will ſoon breed again.

CHAP. VII.

For ſores.

SORES and ſwellings will appear upon fowls in different parts of the body, and they never fail to make the creatures pine. When poultry droop, and their feathers hang rough, let the owner examine them, he will uſually find ſome ſuch diſorder. The cauſe is bad food, or bad water, and ill keeping.

Melt together in a pipkin equal quantities of reſin, butter and tar. Bathe the ſore firſt with warm milk and water, and then dreſs it with this ointment. Two or three dreſſings uſually make a cure; but they muſt be kept more carefully to prevent a return.

End of the THIRTEENTH BOOK.

A Com-

A

COMPLEAT BODY
OF
HUSBANDRY.

BOOK XIV.

Of the diſtemperatures of trees, roots, and herbage, from the injuries done by inſects, larger animals, and weeds.

In THREE SECTIONS.

SECT. I. *Of INSECTS.*

CHAP.
1. *Of ants.*
2. *Of beetles.*
3. *Of worms.*
4. *Of ſlugs.*
5. *Of graſhoppers.*

CHAP.
6. *Of the locuſt.*
7. *Of caterpillars.*
8. *Of the grub.*
9. *Of flies.*

INTRODUCTION.

WE have laid before the farmer the ſeveral accidents to which his crops and cattle are liable, from the ſeaſons and other narural cauſes; and it remains that we treat of thoſe diſtemperatures which are owing to the hurts of inſects. Theſe, by their number, are able to do great damage. This will be beſt guarded againſt by thoſe who moſt thoroughly underſtand their nature. We ſhall treat of them ſeverally, and explain their natures and qualities; the accidents, ſo far as they can be diſcovered, which cauſe their abounding at certain times; and the method by which trees, roots, and herbage, may be preſerved from them: founding all in this part, as the preceding, on experience.

CHAP.

CHAP. I.

Of the ant.

THIS little creature is a troubleſome enemy to the farmer in many articles, and muſt be deſtroyed in ſome caſes, and guarded againſt in others with the utmoſt caution.

In paſture ground it raiſes hills, which we have already ſhewn the methods of cutting up; and in plowed lands it will eat the ſeed before it ſprouts. Birds devour much of it, but they wait to ſee the ſhoot; theſe little enemies, whoſe number enables them to do vaſt miſchief, by what they deſtroy, and partly what they carry away, follow it into the ground, and are themſelves unſeen, as well as the havock they make, till the farmer finds the misfortune in his poor ſhoot.

Ants are great breeders; and they are diſtinguiſhed according to their ſexes: the males have wings, the females none. There are ſeveral kinds of them, the largeſt living in woods; but theſe do little miſchief. The ſmall common ant is the kind hurtful to the farmer. Their eggs are ſmall and round; what is called the ant's egg, is a thin caſe, in which the female lies while the wings are forming. All inſects that have wings lie in a ſtill ſtate ſome time; the ſilk-worm, the caterpillar, the bee, and all others. This called the egg is the ſame ſtate of the ants; and as they are utterly unable to move, during that condition, the reſt take care of them, carrying them to places of ſafety.

The miſchief they do trees is by eating off the young buds; but this is only of a few particular kinds. Some fruits alſo they are fond of, as is ſeen in gardens. In graſs-grounds they do no harm but by thoſe hills, which are troubleſome enough. In new-ſown corn-fields they are moſt deſtructive, creeping in at the chinks of the ground, and ſpoiling more than they devour or carry away. Wheat is moſt ſubject to their depredations; and the ſmalleſt wheat the moſt: as its ſkin is thinneſt, and it is eaſieſt of carriage. Barley they will attack, eſpecially that which is beſt, waiting till it is ſomewhat ſoftened in the ground.

The other kinds that ſuffer moſt, are hemp, flax, and cole-ſeed. Rye they are not very fond of; and all kinds of pulſe are ſafe; for they do not like them; the ſkins are too thick, and the meal is too bitter.

The remedy is deſtroying them; and this is done ſeveral ways. Let the farmer find their neſts, which are under hedges, about the ſtumps of old trees, and on little riſings of ground. Let him carry wet ſtraw to theſe places, cover all the neſts, and fire it. The ſmoak will deſtroy them. If once going over the ground do not anſwer the purpoſe, it muſt be repeated.

The time for doing this is half an hour after ſun-ſet, for they are then all together. They hate lime-ſoot and aſhes; theſe are all good manures, and ſhould be uſed where ants are moſt likely to come. 'Tis alſo a good method to dreſs the land with theſe after they have been choaked with burning the litter. This perfects the deſtruction of them, and they are ſeldom found to infeſt ſuch a piece of ground afterwards.

CHAP. II.

Of beetles.

THE kinds of beetles are innumerable: we have them from the ſtag-horned; which is nearly as big as a wren, to the ſmall black beetle of the roſe-buſh, which is ſcarce large enough to be viſible. Many of them are great devourers. The farmer is aware of them in their winged ſtate; but there is another condition in which they do him greater damage.

In the end of ſummer they lay their eggs juſt under the ſurface of the ground. Theſe hatch into thick white maggots with ſix legs, and after a time of reſt they come out with wings, in the proper form of a beetle. In the maggot or grub ſtate, they eat the roots of graſs and corn: eight years ſince they almoſt cauſed a famine in Norfolk.

In the beetle ſtate they prey upon corn in the ſame manner as ants. They creep into the cracks of the ground, and devour the beſt grains. Their time of miſchief is when the grain is ſwelled, and before it ſhoots. They are more univerſal deſtroyers than the ants, for they have ſtronger jaws, and leſs nicety in their taſte. There is no kind of grain or pulſe ſecure againſt them.

The method of deſtroying them is this. Juſt before the ſowing, carry ſome wet litter into the field: lay it in heaps, and about evening ſet fire to it. That fuel is beſt which makes moſt and thickeſt ſmoak. They lie concealed in buſhes and hedges, but they fly at evening: this is therefore the time to deſtroy them or drive them away. They are afraid of ſmoak as much as ants: they will be choaked in great numbers by it; and what eſcape deſtruction will get far off. The ſame manures that are uſeful againſt the ant, are ſerviceable againſt the beetle: and it is a good method, where they are very plentiful, or a field is particularly in danger, to ſcatter lime over it juſt after ſowing.

CHAP. III.

Of worms.

GArdeners imagine worms do them no harm; but thoſe who have obſerved the field, can tell them they miſtake. There is a particular time at which they feed upon the grain; and they are ſo numerous, that the deſtruction is very great.

There are three principal kinds of worms, the great and ſmall red worm, and the olive colour'd. The ſmall red worms are the moſt deſtructive. They are too common in good lands naturally: and multitudes are brought on with the dung. The time when they deſtroy corn is juſt when it has ſwelled, and is beginning to ſhoot.

A good method of deſtroying them, is to drive a number of nails half way in upon the lower part of the plough which goes into the ground. Theſe tear the worms to pieces in great numbers; and they are alſo very uſeful in breaking the ground more fine.

Another way is, to make fires of wet litter on different parts of the land. This deſtroys many of the ſmall worms that are neareſt the ſurface, and they are what do the miſchief.

The greateſt remedy is ſteeping the ſeed-corn in a proper brine. The taſte of copperas is hateful to worms; and they are no way better guarded againſt than this.

It is ſuppoſed hemp is deſtructive of them, but this is an error. The beſt preſervative is to ſprinkle lye over the ſeed-corn after ſteeping, and then to ſift lime over it, and ſow it, well covered, with both.

CHAP. IV.

Of ſlugs.

WE have named the deſtroyers of crops in the ground; and are next to conſider the devourers of them when they have ſprouted: of theſe none is ſo fatal, ſo numerous, or ſo hard to be conquered, as the ſlug. The ſlug, or naked ſnail, is of two kinds, a large black and a ſmall brown one. The black is the greateſt devourer; but the other is more apt to eſcape, being ſmall and of the colour of the ground.

In gardens theſe eat the hearts of new-planted herbs; but in fields they get a little within the ſurface, and eat the firſt ſhoots of the crop. The ſtalk, which is to ſupport the ear, together with the rudiment of the ear, lie in this firſt ſhoot, and are eaten off by theſe creatures.

The ſmall brown ſlug is moſt deſtructive of wheat and other grain; the great black ſlug of pulſe. They are moſt frequent on land manured with dung; and feweſt of all are found where the ſharpeſt manures are uſed, ſuch as lime.

Two things are found moſt diſagreeable to them; lime and ſoot. The farmer knows the time when they will come to be miſchievous. Let him have ſome freſh and ſtrong lime ready; and about eight days after the ſowing of the corn, let one or more of his chimneys be ſwept for ſoot. Let him mix together equal quantities of the freſh ſoot and lime, and ſprinkle it over the ground. This will greatly promote the ſtrength of the crop, and at the ſame time poiſon multitudes of theſe vermin.

If he has the advantage of a ſhower about this time, let him by all means order the ſoot and lime to be thrown on ſoon afterwards: if not, the beſt time is early in the morning; becauſe they are then out, and upon the ſurface of the ground. In ſmall pieces of ground, a mixture of ſoap-lees and tallow-chandlers greaves, deſtroys them utterly.

CHAP. V.

Of graſhoppers.

THESE feed upon the ſhoot as ſoon as it appears, and are very miſchievous to ſummer corn, and other late ſown crops. They eat thoſe down ſo very deep, that frequently there is never another ſhoot made, but the grain dies. The remedy is of a peculiar kind. They cannot endure the taſte of bitters of any ſort. The farmers, who have a tradition of this kind, boil wormwood in water, and ſprinkle it over thoſe crops which the graſhopper is devouring. But there is a much more powerful remedy. Coloquintida is the moſt hateful bitter in the world; and a very ſmall quantity of it will give its taſte to a vaſt deal of water. This ſhould be ſprinkled on the crop, and will never fail.

CHAP. VI.

Of the locuſt.

THIS terrible deſtroyer we are little acquainted with in Britain. We were threatened with a ſwarm of them ſome few years ſince; and, as it is poſſible, they may come at ſome other time, it may not be amiſs thus ſhortly to mention them.

They devour the green crop of any kind, and in any degree of growth; and when they come in ſuch ſwarms as to cover the whole ground to a great depth, there can be no remedy. If they ſhould ever threaten our crops, it would naturally be in a leſs quantity; and the preſervation would be in the method juſt directed. Coloquintida ſhould be boiled in water, and the liquor ſprinkled over the field. It is a taſte ſo extremely nauſeous, that probably no creature would eat any thing wetted with it.

CHAP. VII.

Of the caterpillar.

CAterpillars are of many kinds. They are the young of the butterfly ſpecies, and are various in their form, ſize and colours. The butterfly lays her eggs upon ſome plant; and there the caterpillars are hatched. This plant is their food, the farmers crops ſuffer becauſe they are well taſted; and the creature does vaſt miſchief.

The pulſe kind are moſt ſubject to them; and it is eſſential to guard againſt them. In trees their neſts ſhould be ſought, after the leaves are fallen; for many of them breed in great numbers, the eggs remaining in the neſt all winter, and hatching juſt when the leaves come out in ſpring. Theſe neſts are generally at the extremities of the branches.

When the farmer ſees them or perceives by their havock they are numerous, his remedy is this: melt ſome pitch in an earthen pipkin, and put to it ſome flour of brimſtone. Let it cool, and divide it into ſeveral lumps. Place ſmall heaps of ſtraw in different parts of the field, and on each lay one of theſe lumps. Set fire to the ſtraw, and the other ingredients will melt and burn among it; and every caterpillar that is within the influence of the ſmoak will periſh. If once be not ſufficient, this may be repeated.

In ſmall plantations uſe the following method. Boil ſome tobacco in urine, and add to it ſome ſoap-lees. Sprinkle where the caterpillars are, and it will deſtroy them.

CHAP. VIII.

Of the grub.

THE grub is the worm produced by the eggs of the beetle. There is one particular kind more deſtructive than the reſt; and when the grub is mentioned without any diſtinction, this kind is meant. It is a thick, ſhort, whitiſh worm, with a hard red head, and ſix ſhort legs. It is found among the roots of corn, and does prodigious miſchief. It feeds on the ſweet matter of the corn, which is at that time a kind of pap, like cream; and leaves the ſhoot to wither, and the body of the ſeed to decay. This creature is the produce of the cock-chafer, which is abundant in hedges in ſummer evenings.

It is an endleſs taſk to deſtroy the grub, becauſe it lies under the ground; but there is no difficulty in preventing the danger, by deſtroying the old ones, to whoſe eggs the next brood muſt be owing. We have directed the farmer to defend againſt beetles in general, by making a great quantity of ſtinking and ſmothering ſmoke; and the ſame method is to be practiſed in this caſe. He is to burn wet ſtubble under all his hedges; and he will by this means either deſtroy or drive them from his ground.

CHAP. IX.

Of flies.

THESE are as innumerable in their kinds, as beetles or caterpillars, and no inſect is more deſtructive of the farmer's crops. We have ſpoke of the damages they do to turnips, and other young ſhoots of uſeful plants; and ſhall refer the reader to their proper place for theſe conſiderations; but ſhall here give a general account of this deſtructive creature.

Among flies thoſe which are the moſt conſpicuous are the leaſt hurtful. The ſmalleſt kinds are in the higheſt degree miſchievous. The dragon fly, called the horſe ſtinger, has no hurt in its diſpoſition: a harmleſs inſect, formed to wanton in the fields of air, to amuſe us with its beauty, and the rapidity of its flight; and to do nothing to injure us.

It is much the ſame with the reſt of the large kinds of fly: but it is otherwiſe with the ſmall ſorts. They herd together, ſettle upon the boughs of uſeful trees or plants, and deſtroy and pervert the courſe of nature by their ſucking. Wherever theſe appear, the method for deſtroying them is by proper ſmoaks: there are ingredients to be uſed in this manner, which ſpread their effects ſo far, and operate ſo powerfully, that it is ſcarce poſſible for to eſcape them.

The ſmoak of brimſtone is moſt efficacious to this purpoſe: there is a ſuffocating ſteam attends it no creature can endure. This is proper when it can be uſed conveniently, but it does not ſpread its effects far. A few matches burnt under a place where are a ſmall parcel of theſe vermin, will ſtifle them all, but there is no ſpreading the influence of it over a whole field.

Orpiment is, of all known ſubſtances, the moſt extended in its influence; and happily for the farmer, the ſmoak of this is offenſive beyond all other things. A dram of this will make as much ſmother as a vaſt quantity of ſtraw; and the ſmell is like that of garlic, only more offenſive.

This is the farmer's beſt ſafeguard againſt the fly which ſeizes innumerably upon many of his crops. He need not be afraid to uſe it, from its having been called a poiſonous ſubſtance; for that is an error; it is a common thing to call yellow ratſbane by this name, but that is a thing altogether different. Yellow ratſbane is made by art; but the right orpiment is found natural in the earth: and the farmer's great care muſt be to purchaſe it of an honeſt perſon, and to explain what he does, and what he does not mean.

Let the farmer who has crops over-ſpread with flies, take a day when there is a little wind; and place himſelf ſo that it may convey the ſmoak he ſhall make directly upon his crop. Then let him light a few pieces of charcoal, and ſet over theſe a fire ſhovel with an ounce of orpiment beat to powder. There will preſently riſe from it a thick white ſmoak. The wind will drive it from him; but it will ſpread over a vaſt ſpace of ground: if the field be ſmall, once burning will do; if larger, it may be repeated in two or three places.

BOOK XIV. SECT. II.

Of damages from larger animals.

Chap.
1. *Of mice.*
2. *Of moles.*
3. *Of birds.*

CHAP. I.

Of mice.

THERE are ſeveral ſpecies of field mice; but they are all equally the farmer's enemies: all feeding upon his ſeed-corn and pulſe; and are all to be deſtroyed by the ſame means. Drier lands are more ſubject to theſe than wet; and ſowing under furrow moſt expoſes the ſeed to them.

The furrows will fall ſomewhat hollow, and they afford a ſhelter to the mice at the time of their committing their havock; for the corn lies perfectly expoſed to them, and they are not expoſed to his eye while they are feeding upon it.

In theſe lands I have traced the path of thoſe devourers, and ſeen all eaten up, or carried away to ſome little diſtance; for under the covert of this tillage they will make their neſts and granaries as it were in different places; and the ſeed ſhall be found ſtored up in one of theſe, that ſhould have covered a great ſpace of ground with its ſhoot. Though this manner of ſowing gives the mice an advantage, the other way does not ſufficiently ſecure the corn from them. When it is ſown in the uſual way and harrowed in, it is better covered; and there is a great deal more trouble for them to get at it: but they are very induſtrious, and will dig after it, and tear up and deſtroy a great deal.

When it is ſown under furrow they begin with it as ſoon as it is in the ground; but when it is harrowed in they wait for its firſt ſprout. This gives the farmer an advantage, becauſe he knows when he is to expect them. He is not in this caſe to wait till he ſees the ſhoot of his ſeed; for the mice have quick eyes, and will perceive it a day or two before he does: he is to look to his ground a day or two before the time of its being covered; and then, as he knows the devourers will be about, he is to prepare for their deſtruction. Traps are a poor method. There is no way worth his conſideration but poiſon; and there are drugs which will anſwer this purpoſe, which are not poiſon to ourſelves. It would be a diſagreeable thing to be meddling with ratſbane; but there is no harm in handling the ingredients he has to uſe.

Mix up a peck of barley meal, a pound of powder of white hellebore root, and four ounces of powder of ſtaves-acre; ſifting them through a hair ſieve, then add half a pound of honey, and as much milk as will work the whole into a paſte. Let this be broke into pieces, and ſcattered over the field. They will eat it greedily, and it is certain death to them.

This is the method juſt at the time of danger; but the farmer who is peſtered with theſe vermin, ſhould think at other times of deſtroying them. They live at a ſmall depth, and there breed in abundance. The paſſage into their neſt is by a little round hole, eaſily ſeen in dry weather. The farmer ſhould go his rounds with a quantity of the paſte before directed; and wherever he ſees a hole throw in a piece. A little trouble taken from time to time in the heat of ſummer when the holes are moſt conſpicuous, would utterly deſtroy them.

CHAP. II.

Of moles.

THESE are enemies of another kind; but do as much miſchief. We ſee their hills in paſtures. But the damage they do to corn is greater; and frequently comes upon the farmer unexpectedly. He knows that ants and mice will eat the grain when newly ſowed, and ſlugs deſtroy it when juſt ſhot up; but when theſe times are over he is at reſt: on the contrary, there is no time at which the mole may not deſtroy his crop. This creature is fond of the roots of corn; and beſide the quantity they deſtroy by eating, they damage a vaſt deal more by undermining the ground. 'Tis hardly to be conceived what havock a ſingle mole will make in a field of corn; or in how little time: one of theſe creatures will burrow through a third part of an acre in a day; and this perhaps at a time when the corn is half grown. The drieſt lands are moſt ſubject to theſe animals, but they will get into any; and there is no creature againſt which it is ſo difficult to guard. There is no foreſeeing when they will come; but it is very important to know of their being in the ground as ſoon as poſſible.

The caution is to obſerve whether there be any there at the time of plowing. If there be, he is to uſe every method of deſtroying them: if not, he is to examine whether the lands neareſt his own every way be infeſted by them, or clear from them. The freer they are the more likely he is to be clear of them; but there is no certainty: there are times when they will come without any poſſible gueſs from whence; and they will ſometimes have done irreparable miſchief, before 'tis diſcovered they are in the place. They are a defenceleſs creature, and not cunning. Their only ſecurity is the being hid; and they betray themſelves by the manner of their working.

The huſbandman is to look for the tracks where they have gone; he will eaſily know them by the different colour of the new turned up earth. He is to follow the courſe of one of theſe paſſages, and to dig croſs holes in it, and watch the going out or coming back of the mole. Wherever it is caſting, he is to ſtrike it through with an iron inſtrument made for that purpoſe. The traps for them are alſo common, cheap, and of a plain ſtructure. In ſome places the farmers content themſelves with driving them out of the fields: this is to be done by ſmoaking them, as other creatures of a leſſer kind are deſtroyed. They open their paſſages in ſeveral places, and burn heaps of ſtraw and ſome brimſtone. This will drive the moles out of a corn field: but it is not a ſafe or eligible method. It is only ſending them out of ones own ground into a neighbours, who may in the ſame manner drive them back again. This is only a temporary relief; and there is none effectual but their deſtruction.

CHAP. III.

Of birds.

THESE are as hurtful as reptiles or inſects; and muſt be guarded againſt by other means. Corn is open to a vaſt variety of birds, larger and ſmaller; and they are continually ſeeking after it. Small birds follow the ſower, and from that time they are daily ſeeking after all that does not lie too deep for them; and they will in ſpite of the beſt care eat a great deal.

When the grain is about to ſhoot, the rook comes in. He perceives the firſt ſpire that gets above the ſurface, and tears up a great deal. There is no ſeed that is not food for theſe devourers. They fall upon all alike. The beſt defence againſt theſe devourers is the new method of huſbandry.

Drill ſowing gives ſecurity to ſeed, and limits the time of the danger of its being devoured, ſo that it is much more eaſy to protect it. There is nothing of that loſs of the ſeed as thrown from the hand; nor can theſe rapacious creatures pick it up day by day afterwards as it lies expoſed; 'tis covered by that practice, and the ſole danger is juſt when it begins to peep above ground. If a boy or two be employed at that time to fright the birds away, it is naturally ſecure at all others.

About a fortnight after ſowing of barley and other ſummer corn, and about ſix and twenty days after ſowing wheat, rye, and the like, in autumn, let a couple of boys with piſtols be ſent into the field. Guns are unmanageable for ſuch perſons, and killing is not ſo much the purpoſe as the frightning. Any ſervant of the farmer's may with a gun kill a crow or two, or half a dozen ſparrows, and they may be ſtuck up in the field. The boys need only fire powder, and they will thus weary and fright the birds away.

Morning and evening are the time of birds feeding. The boys muſt be ſent into the field an hour before ſun-riſe, and muſt ſtay half an hour after ſun-ſet; and theſe are the times when they muſt be moſt vigilant.

BOOK XIV. SECT. IV.

Of the damage from WEEDS.

Chap.
1. *Of the nature of weeds.*
2. *Of the ſeveral kinds of weeds.*
3. *Of clearing the ground of weeds.*

CHAP. I.

Of the nature of weeds.

WHEN the farmer has been at the charge of enriching his ground, he expects the advantages of his labours, and wiſhes the improvement he has made may give all its fertility to his crop: but nature ſows while he is ſowing; and her proviſion for keeping up the ſpecies of plants is very wonderful: their ſeeds are ſcattered to great diſtances, and where they fall they grow. While the ſeeds of ſome plants are winged with down to make them float upon the air, the roots of others are ſo full of life, that the leaſt morſel remaining in the ground will grow.

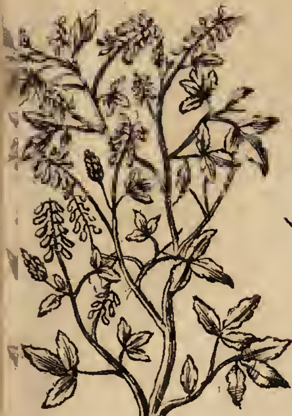
In animals the loſs of a limb or other eſſential part cannot be reſtored, except in ſome few particular kinds: but in plants, while any thing remains the whole will be renewed. Hence is the origin of weeds to be traced by the farmer, and hence he will find them univerſal. He is according to this diſtinct manner of their growth to divide them into two kinds; the perennial, or thoſe which commonly riſe from roots left in the ground; and the annual, which ſpring from ſeeds brought on by the winds.

A perennial plant is one whoſe root lives through winter, and ſhoots afreſh in ſpring. The ſeeds of theſe may be brought by winds; but they are moſt pernicious when they riſe from roots; the miſchief lying deeper, and the plant being ſtronger.

The annual are ſuch as riſe only from ſeeds: theſe flower in ſummer, and die when they have perfected their ſeeds, which nature ſcatters for a ſucceeding crop. Perennial weeds ought to be got out in the tilling of the ground: the annual are to be cleared away afterwards by hoeing: for they are not in being when the tillage is performed.

Beſide the effect of wind, theſe plants will riſe from ſeeds buried in former tillage. The ſeeds of theſe will not grow unleſs they are near the ſurface; but many of them will continue good

Annual Weeds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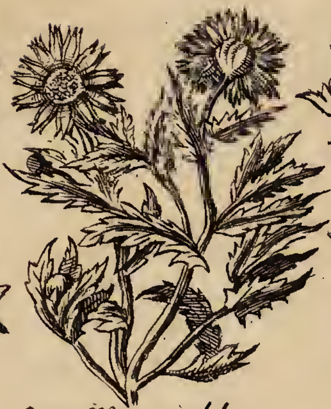
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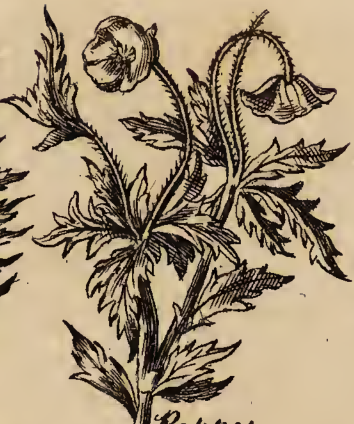
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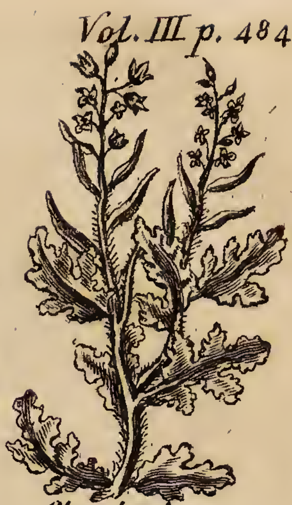
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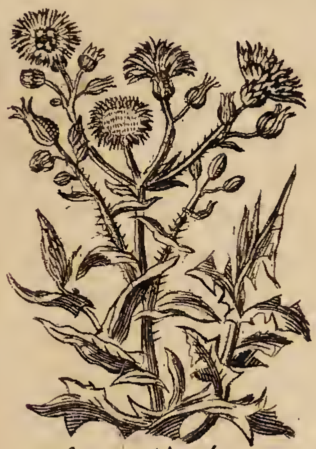
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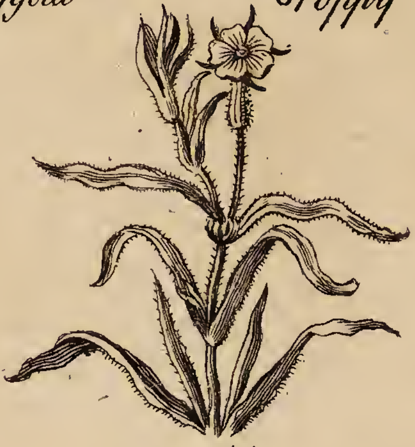
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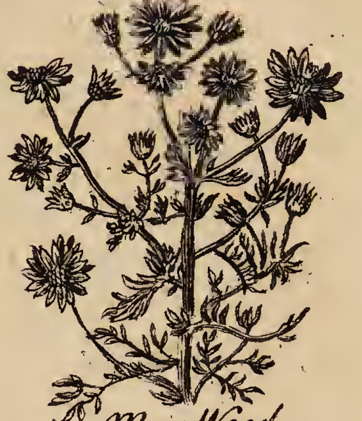
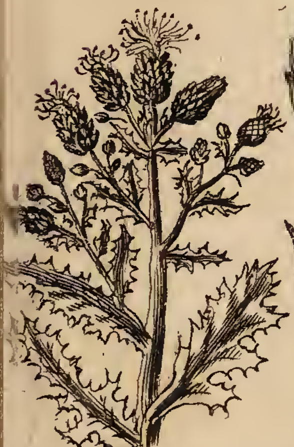

May Weed

Perennial Weeds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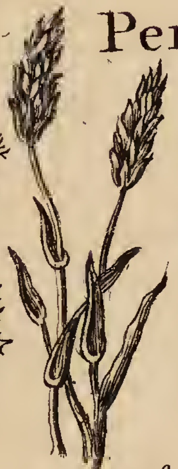
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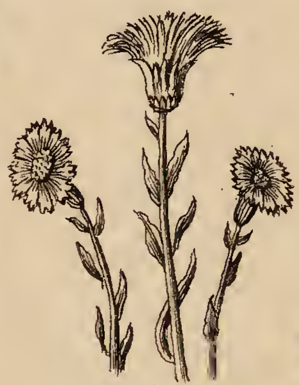
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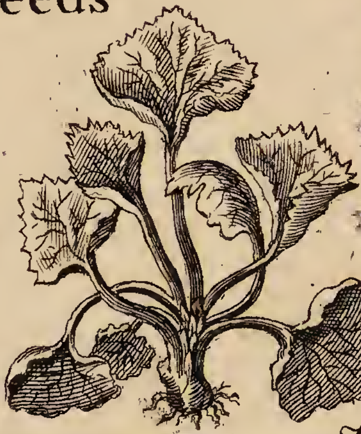
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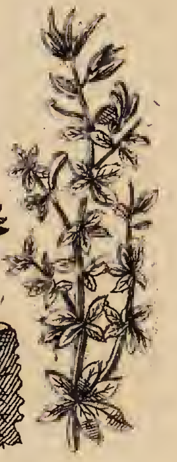
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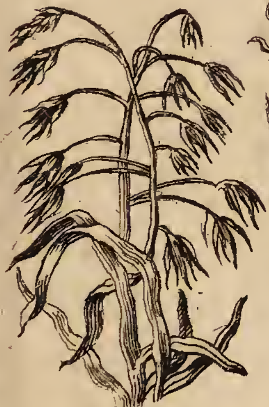
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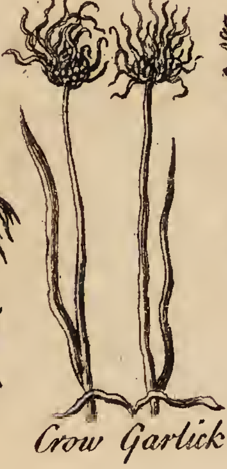
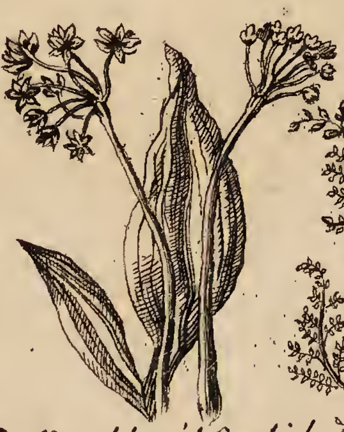
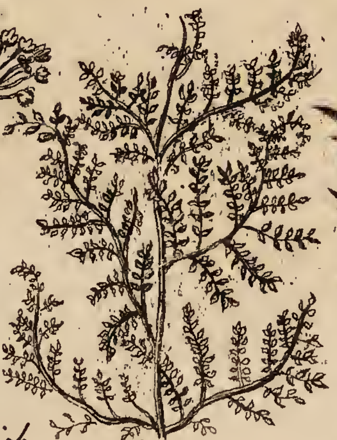

Crow Garlick


Broad leav'd Garlick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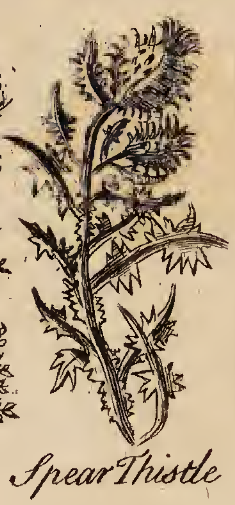
Spear Thistle

Compleat Body of Husbandry

good when at a greater depth, and will grow when they are brought nearer the air by tillage.

It is impoſſible to guard againſt weeds, and the buſineſs is to deſtroy them. The better fences are kept up, the fewer ſeeds will be brought into the grounds; becauſe the greater part are ſtopped by the leaves, and fall there. This is the reaſon why hedge bottoms are always full of weeds. The better tillage is uſed, the more the roots of perennial weeds will be taken out of the ground; but there will be ſtill room for ſome encreaſe. Some ſeeds will come in, and ſome will be ripened upon the ſpot; ſo that notwithſtanding the beſt care to prevent their growth, a great deal will alſo be required to deſtroy ſuch as riſe.

Weeds are to be expected in all places; and they will outgrow all crops. They are natives of the ſoil and climate; and will thrive better than ſuch as are raiſed by art. It is a great advantage in the drill and horſehoeing huſbandry that they can from time to time be deſtroyed as the crop is growing; and that every time they are cut up the ground receives a kind of tillage. In the common method they grow with the crop; and as they are naturally more vigorous, they draw the greater part of the nouriſhment from it.

CHAP. II.

Of the ſeveral kinds of weeds.

EVERY thing that grows among a crop without being ſown or planted, is in that place a weed. Thoſe weeds are moſt numerous which riſe from ſeeds; and thoſe moſt difficult to be extirpated which come from roots. *Sowthiſtles* and *groundſell* are an inſtance of the firſt kind, and *reſtharrow* of the latter; its root is ſo tough it will impede the progreſs of the inſtruments according to its name; and ſo full of vigour that the leaſt morſel will grow.

Some have both theſe ill qualities of propagating abundantly by ſeed, and ſpreading alſo from their roots. *Colts foot* is an inſtance, its ſeeds are winged with down, and the root is as tough and full of life as that of *reſtharrow*; theſe are the moſt pernicious of all. *Couchgraſs* propagates almoſt entirely by root; but it ſpreads ſo faſt and ſo far, that nothing is more prejudicial.

From this review of the ſeveral natures of weeds, the farmer will know how he is to conduct himſelf. When he is about to enter upon the tillage of a piece of ground, let him conſider what are the weeds upon it, and by that determine his method of working: the horſehoeing huſbandry is preferable in this reſpect, but moſt of all where the ground is over-run with perennial weeds.

The *common way thiſtle* is one of thoſe of the worſt kind, its roots creeping and ſpreading, while its ſeeds fly by means of the down.

Fern is another creeping rooted weed; and *melilot* is hateful not only by its abundant propagation, but its abominable flavour. Theſe hurt the farmer two ways; they impoveriſh his crop, and give an ill condition to the grain. Wild garlick does the ſame damage. Where there are an abundance of thiſtles, and ſuch other kinds, the ground will coſt much more expence than under any other condition: the beſt practice is to tear it up with the four coultered plow, to harrow away the roots immediately after every plowing, and to work it up by the drill and horſe-hoeing method. This will in a few years clear it of the worſt weeds, and if he follow any other practice, they may remain torments to him throughout the longeſt leaſe.

The deep plowing and repeated harrowing will tear up and draw off a very great part of theſe roots; but as ſmall fragments will grow, they would after this riſe among the crop, and ſtrengthen themſelves in the ground during its growth: whereas in the horſehoeing method, the ſmalleſt fragments, as ſoon as they begin to grow, will be torn up and thrown out in the intervals, and very eaſily cleared from among the rows of the crop; and as theſe intervals of the preſent year are to be the places of rows of crop in the ſucceeding, the ground muſt in a few ſeaſons be cleared from them.

CHAP. III.

Of clearing the ground of weeds.

WEEDS utterly deſtroy ſome crops; and never fail to injure others in proportion to their number and nature. Hand-hoeing will, in ſome caſes, anſwer the purpoſe with annual weeds, as the horſe-hoeing does with the others; but even this, in the common random way of ſowing, is ſcarce practicable.

We have told the farmer what he is to do in a land over-run with the perennial kind; and ſhall ſuppoſe him now about to undertake a piece that is tolerably free from theſe, but covered with the annual. The horſe-hoeing method is preferable in this caſe alſo to any other, becauſe it not only effectually deſtroys ſuch as riſe after the ſowing, but makes them uſeful as a manure: but if the farmer is averſe to this, let him take a middle courſe. Where he ſees this abundant growth of annual weeds, he may be ſure there will be a proportional increaſe among his crop: they muſt be deſtroyed, or they will ſtarve his corn. In the common way of ſowing, nothing is ſo difficult as to get out weeds in the growth; but in this caſe it would be impracticable: therefore if he will not admit the hoe-plough into wide intervals, let him ſow by the drill with ſomewhat narrower, that his crop may ſtand clear, and diſtinguiſhed from the wild growth; and that the hoers may eaſily and conveniently clear the ground between the rows with hand-hoes.

This is an improvement of the common practice, and will be of great ſervice; becauſe the hoers, while they clear the intervals between the rows, may alſo draw up the weeds by hand that grow in the rows; but this is by no means comparable to the other method. The hand-hoers leave parts of the roots in the ground, and after the firſt ſhower there is a new crop of weeds; but the horſe-hoe, tearing up the roots, admits of no ſuch return.

Theſe are the methods the huſbandman will find moſt ſucceſsful; but if he be ſo devoted to the old method, that no advantage can lead him out of it, his recourſe muſt be to a ſummer's fallow. The more the ground is infeſted with weeds, the more care muſt be taken in the turning it up. A dry ſummer will deſtroy a vaſt number when they are from time to time torn up and expoſed to the ſun; but there are ſeeds that will lie a whole year without ſhooting, and on theſe the fallow takes no effect.

The wild oat is of this kind, and ſeveral others; for there are plants whoſe ſeeds naturally lie twelve or eighteen months in the earth. Theſe eſcape the farmer's diligence in a ſummer fallow; they are not to ſhoot till the ſucceeding ſpring, and then they come up with vigour, as if the fallowing had been a preparation of the earth for them.

We repreſent theſe things as they are, and hope the proofs of advantage attending the practice of the new method, will induce him to follow it. The ſeeds that lie this length of time in the ground, are not the only ſource of a ſucceeding year's growth of weeds; a vaſt number are brought in with the dung and other common manures, and the great quantity riſing from ſeeds, wafted in by winds, join in ſhewing that a method of huſbandry which deſtroys them while the crop is growing, muſt more perfectly anſwer the purpoſe, than one by which they are only kill'd before the ſowing.

Dung is compoſed chiefly of the ſtalks of corn; and, among theſe, there go into the litter the ſtalks of weeds and their ſeeds; therefore while the farmer is enriching the land for his crop, he is ſowing weeds to reap the benefit of it. Theſe will riſe in their full number, and they will thrive upon the newly-enriched ſoil abundantly. They can only be deſtroyed while the crop is growing, becauſe they only grow with it.

The farmer in ſome caſes attempts it, by weeding among his corn: but this is a method the worſt calculated of all that ever were introduced into huſbandry. The feet of the weeders muſt do harm, and it is often more than their hands do good. The corn ſtanding irregularly, there is no avoiding trampling ſome of it down; and in other crops which more reſemble weeds in their firſt ſhoot, there is the danger of tearing them up. This is the caſe with the annual weeds, and it is ſtill worſe with the perennnial: they cannot be pulled up, becauſe that would tear up ſome of the corn with them. All that can be done is the cutting off their heads; the nearer the root the better; but however near this is done, the remedy is only ſlight, temporary and imperfect; the root remains in all its vigour, and new ſhoots preſently riſe in the place of the old one. Theſe are more numerous and draw more nouriſhment. Thus what appears a remedy, is an increaſe of the diſeaſe.

All this is obviated by the horſe-hoeing huſbandry: that deſtroys all weeds without any poſſible damage to the crop. This is plain to reaſon, and it is found true by experience; and with this laſt recommendation, added to the many we have occaſionally named before, we cloſe this part of our treatiſe.

End of the FOURTEENTH BOOK.

A COM-

A COMPLEAT BODY OF HUSBANDRY.

BOOK XV.

Of the poiſonous and hurtful plants native of this kingdom.

In Two Sections.

SECT. I. Poisonous.

Chap.

1. *Of henbane.*
2. *Of hemlock.*
3. *Of deadly nightſhade.*
4. *Of water dropwort.*
5. *Of dogs mercury.*
6. *Of herb chriſtopher.*
7. *Of water-crowfoot.*
8. *Of yew.*

SECT. II. Hurtful.

9. *Of white rot, or cotyledon paluſtre.*
10. *Of red rot, or ros ſolis.*
11. *Of louſewort, or pedicularis.*
12. *Of ſpurge laurel.*

The INTRODUCTION.

WE have acquainted the farmer with what he ought to know, and what to do for the ſucceſs of his buſineſs and improvement of his crops. We have occaſionally, with what he is to undertake, ſhewn him what he is to avoid, and there requires but the ſingle article we are here to treat of, to finiſh the deſign.

In treating of the diſorders of cattle, we have mentioned their eating unwholſome plants; and theſe we are to conſider more at large in this place. This kingdom does not afford many; but what there are the huſbandman ought to know, for the ſecurity of his ſtock, and of the young among his family. Inſtinct gives creatures a general direction not to feed on hurtful things; but they ſometimes neglect the caution; appetite in them, as well as in ourſelves, getting the better of admonition. To us who have reaſon, this inſtinct is not given; and while too young to exert it, we are in the way of danger; nor are we at any time, without due information, altogether above the power of accidents of this nature. For this reaſon we ſhall here give the huſbandman the full and diſtinct knowledge of what hurtful plants may fall in his way, adding to their deſcriptions the aſſiſtance of figures, that he may deſtroy them wherever he perceives them riſe.

BOOK XV. SECT. I.

Plants abſolutely poiſonous.

OF theſe there are no more than eight wild in England: the farmer will, from the figures and deſcriptions, eaſily be acquainted with this ſmall number: and we ſhall give him an account of their effects, not exaggerated by fancy or falſe hiſtories, but from experience and authorities above the reach of queſtion.

CHAP. I.

Of henbane.

HENBANE is a large ſpreading plant: it is capable of doing great miſchief; and is not confined to woods or remote places, but grows naturally upon ditch banks, and is common almoſt every where. Nature which has thrown it in the way of mankind, yet has ſtamp'd ſo ſtrong a mark of its qualities in every part, and given notices of its hurtful properties ſo evidently to all the ſenſes, that ſhe ſeems to have given a ſufficient caution againſt any danger. It differs from all other plants in the form and hue of its leaves: its flowers are of a deadly diſmal colour; and the whole plant is forbidding in its aſpect. The eye marks it for a poiſon; and when offered to the other ſenſes, they anſwer in the ſame language. Its taſte is nauſeous, but this cannot eaſily come into tryal; for its ſmell, which will be perceiv'd firſt, is moſt offenſive.

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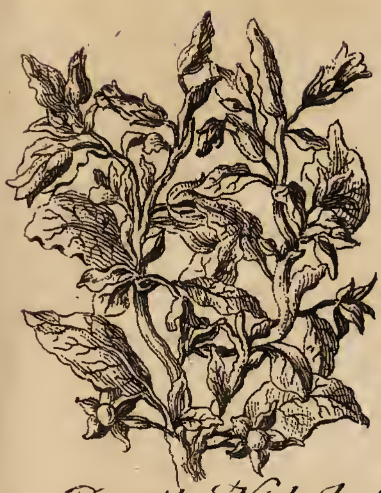
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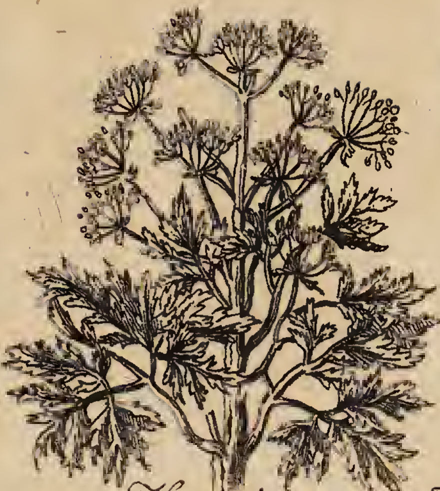
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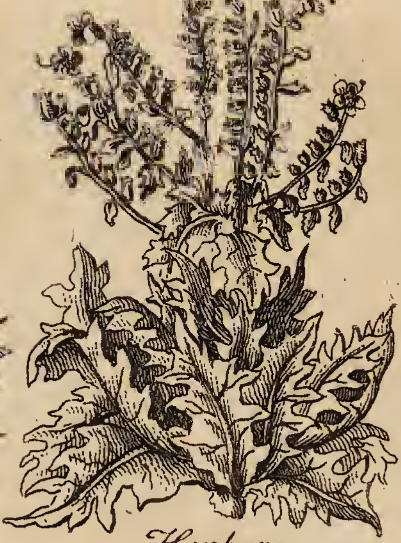
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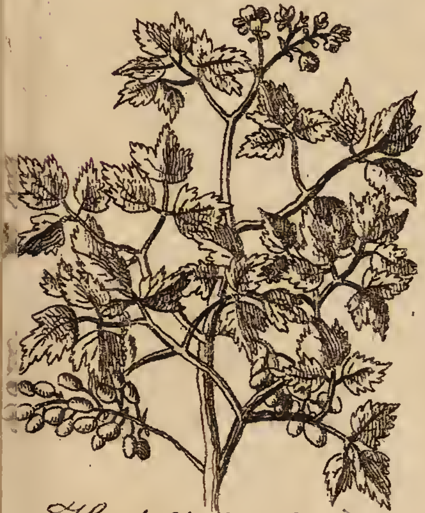
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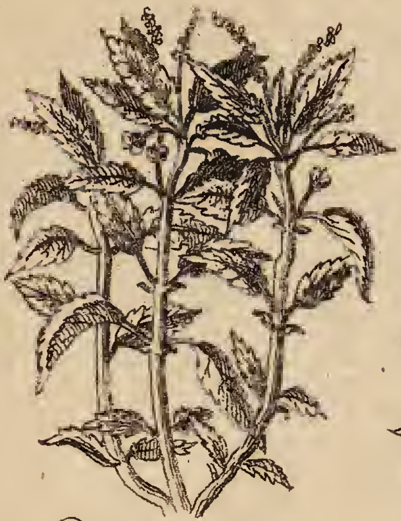
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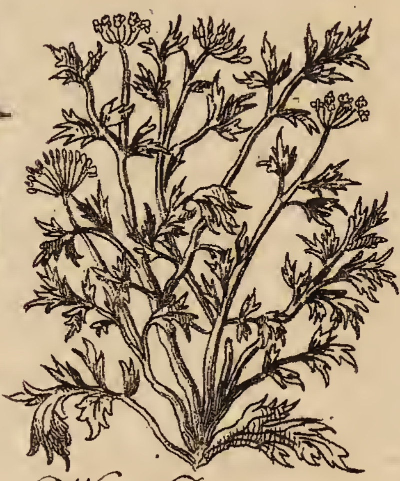
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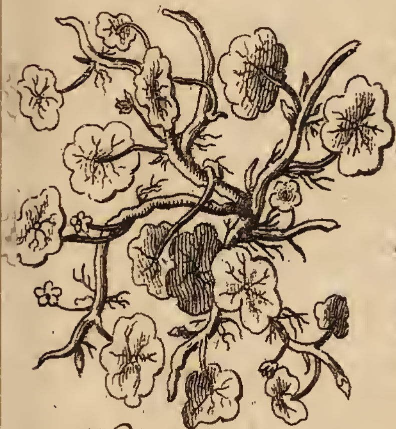
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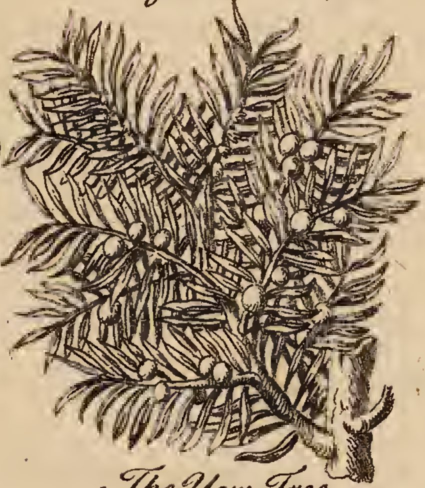
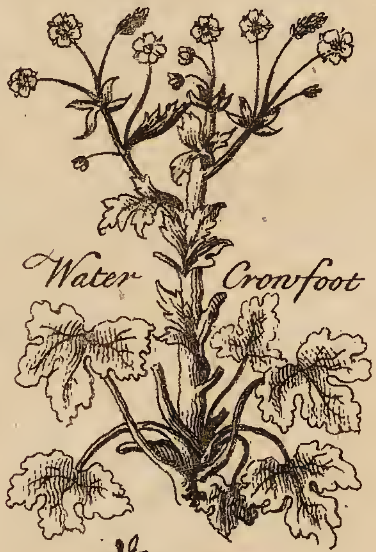

The Yew Tree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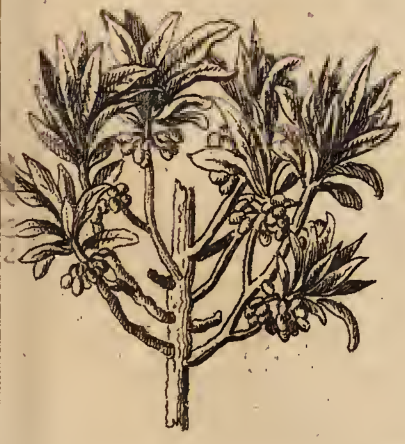
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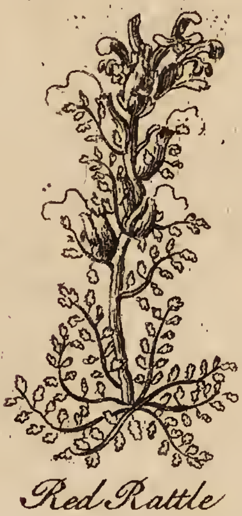
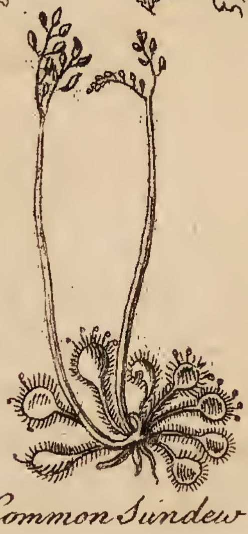

Red Rattle


Common Sundew

Compleat Body of Husbandry

By this diſmal look, and this forbidding ſmell, has nature warn'd men to beware of henbane, though they ſee it frequent about their dwellings: we ſhall prevent the poſſibility of miſtaking it for any other plant, by adding the deſcription of its ſeveral parts. The root is thick, long, and irregular. From this riſe eight or ten leaves, very large, long, and of a greyiſh green colour. They are very deeply indented at the ſides. The ſtalk grows up in the midſt of theſe, and is whitiſh, hard, woody, full of branches, and two feet high. The upper branches ſpread out very much. Many leaves grow upon this, like thoſe that firſt riſe from the root. The flowers are numerous and large, but they are not conſpicuous. They are hollow, like a bell, and are of a dead colour, vein'd in a very curious manner with purple. After theſe come ſhort thick ſeed-veſſels, which are full of ſmall brown ſeeds.

Every part of this plant is poiſonous, and it deſtroys people by throwing them into drowſineſs, like a lethargy, with convulſions. Cattle will ſometimes eat the young leaves, and this throws them into the ſleepy evil, deſcribed before: if they have eat a great deal no medicines can recover them. Hogs will grub up the roots, and it affects them in the ſame manner. Chickens will pick out the ſeeds; and if they eat a large quantity, they die by it. This is the reaſon of its name *henbane.*

There have been inſtances of country fellows eating the roots by miſtake; and they have died in the moſt miſerable manner in convulſions.

The ſeeds of white henbane which are uſed in medicine, are thoſe of a different plant, called white henbane. This is altogether poiſonous.

CHAP. II.

Of hemlock.

THIS is another poiſonous plant which nature, for reaſons to us unknown, has made to grow in great abundance near our habitations. It is a gloomy-looking plant, and by no means inviting to the eye. Its ſmell alſo is heavy, and ſeems to the moſt ignorant perſon unwholſome.

There is a ſort of hemlock which grows of itſelf in gardens, and reſembles parſley; but this, though a very unwholſome plant, is not the poiſonous kind. That is the large kind which grows wild in hedges; and it is diſtinguiſhed by its height, its aſpect, and its painted ſtalk. The root is white, thick, long, and of an unpleaſant ſmell. The leaves that grow from this are very large, two foot broad, but divided into innumerable ſmall parts, in a regular and beautiful manner; and they are of a dull a dull and blackiſh green. The ſtalk grows up in the midſt of theſe, and it is two yards high, and as thick as a child's arm. It is of a dingy green, but painted in a beautiful manner with purple, ſo that it reſembles the ſpeckled ſkin of a ſnake. The flowers are white, they are ſmall, but they ſtand in large cluſters at the tops of the branches. The ſeeds are roundiſh, of a pale green colour, and ſtriated. Two come after every flower.

There are ſeveral other kinds of this; eſpecially a very ſingular one with a thick ſtalk, that grows in waters. They are all of a poiſonous quality; but this common hedge kind worſt of all. The ſtalks are the moſt poiſonous part; and next to them the ſeeds. Some pretend the root has ſcarce any bad qualities; but this is not confirmed upon ſufficient experience.

The Athenians extracted the juice of hemlock from the lower parts of the ſtalks before the plant roſe up to flower; and with this poiſon they executed criminals inſtead of hanging. Socrates died by it.

Many of thoſe diſeaſes of cattle which perplex the farmer and the farrier, and at length end in the creature's death, are the effect of eating the young ſhoots of this plant. Some birds feed upon the ſeeds without hurt; but they are fatal to other creatures.

C H A P. III.

Of deadly nightſhade.

THIS is a plant not ſo common as the others; but that wherever it is ſeen ſhould be rooted up, for it is fatal to children. Nature, which has not planted this in the way of miſchief ſo much as the other two, has not been careful to mark it as thoſe for a thing to be dreaded. On the contrary, it is a beautiful plant, yet with a ſomewhat melancholy aſpect. The root is long and thick, and it creeps under the ſurface of the ground. From this riſe many large and broad leaves of a deep green colour, and not at all notch'd at the edges. The ſtalk is round and thick, divided into many branches, and a yard high. It is full of leaves like thoſe from the root, and toward the top has many flowers. Theſe are large, hollow like a bell, and of a duſky purple.

After theſe come berries which are large, and of a very tempting aſpect; they are of a ſhining and jetty black, and are as big as cherries. They are ripe in July and Auguſt. Children are tempted to eat theſe, and they are always fatal. A ſingle berry will bring on convulſions; but they ſeldom ſtop with one or two. They commonly die miſerably a few hours after eating them.

I remember an inſtance of two children in Northamptonſhire, who eat immoderately of them, and did not live to get home. They were track'd from the plant to the place where they fell by bloody ſtools, and there died in convulſions.

CHAP. IV.

Of water dropwort.

THIS is a plant, which, like the former, has been fatal to many perſons, who have been tempted by the look to eat of it. The root poſſeſſes the greateſt degree of poiſon. It always grows by waters, and is very common in moſt parts of the kingdom. The root is compoſed of ſeveral long and large pieces which reſemble parſnips in ſhape and colour. The leaves from theſe are large, and of a pale green, and they are divided into a great number of ſegments. The ſtalks riſe ſeveral together, and are upright, divided into many branches, and a yard high. They have ſeveral leaves upon them like thoſe from the root, and of the ſame faint colour.

The flowers are ſmall and yellowiſh; they grow in great tufts at the tops of the ſtalks, and after every one of them there come two ſmall ſeeds. The roots, when freſh taken up, have an inviting aſpect: they run out a white juice like milk when cut; and this preſently after turns yellow. Many have eat of them, and all died. We have inſtances of the ſad effects from very early time; and within theſe few years the ſame fatal ſcene has been repeated. They take the ſame effect whether raw or boiled; and thoſe who eat them die raving.

CHAP. V.

Of dog's mercury.

THIS is another of thoſe plants which tempt the ignorant by their pleaſing aſpect, and are in their effects fatal. The whole herb appears very inviting; it is freſh and green at a time when every thing elſe is dead; and many have eat it raw or boiled, and periſhed by it.

It is common under hedges, and has a very alluring look. The root is ſlender and long; it divides into many branches, and ſpreads under the ſurface of the ground. The ſtalks are round, upright, not at all branched, of a faint green, and about a foot high. They are almoſt naked toward the bottom, but nearer the top there ſtand many leaves; theſe are long and notched at the edges; and they are of a bright pleaſant green. The flowers are inconſiderable. On ſome parts there ſtand ſpikes of a greeniſh colour, and on others ſeeds, which are as it were double.

The plant is in full vigour early in ſpring, and its freſh look has tempted many to boil it for food. Whole families have been poiſoned by it. The children have generally died: ſometimes the father and mother have recovered; but in other inſtances all have periſhed together. They die in convulſions, and in the greateſt agonies.

CHAP. VI.

Of herb chriſtopher.

THIS is a plant as fatal in its effects as any; but happily it is found in few parts of this kingdom, and there generally in woods, far remote from dwellings. The root is long, thick and whitiſh.

From this riſe large leaves, ſupported on long, red footſtalks. Each leaf is divided into many ſmall parts, and it is of a deep green colour. The ſtalk riſes in the midſt, and is round, upright, reddiſh, and two feet high. Several leaves grow upon this, which in all reſpects reſemble thoſe from the root, and are when bruiſed of an unpleaſing ſmell.

The flowers ſtand in long cluſters upon ſmall ſtalks growing at the top of the plant, and from the boſoms of the leaves; they are ſmall and white. The berries that follow theſe hang in the manner of bunches of currants, and they are of a ſhining black colour. They are ripe in autumn. Children who have gone out to gather black-berries have been tempted to eat theſe, and have in conſequence died in convulſions. The plant has been from this named bane-berries. The young ſhoots alſo poiſon cattle.

CHAP. VII.

Of water crowfoot.

EVERY one knows the common crowfoot of the meadows, which children call butter cups: that is of a burning quality; but there is one kind of it which has been ſometimes eaten, and has never failed to prove a deſperate poiſon, deſtroying people in a particular and very frightful manner. This is common in watery places, and is perfectly different from all the others, and indeed from all other plants. The root is compoſed of white threads. The leaves riſe from this, a great many together, and are broad, of a roundiſh ſhape, irregularly divided about the edges into three or more parts: they are ſmooth, of a ſhining ſurface, and of a pale yellowiſh green.

The ſtalk riſes up in the midſt of theſe, and is very thick, fleſhy, of a pale green, two foot high, and divided into a great many branches.

Several leaves grow upon this like thoſe from the root, and are of a pale green. The flowers ſtand at the tops of the branches: they are very ſmall and yellow; and reſemble the common crowfoot flowers in ſhape, but they are paler coloured. The ſeeds are ſmall and green; they ſtand together in a kind of oval heads, and eaſily fall off when touched.

The plant is common about the edges of ponds; and where water has ſtood in winter. Its leaves are up early in ſpring, and by their freſhneſs tempt cattle and ſometimes men to eat them. They are the cauſes of many of thoſe diſorders which affect cows and oxen in the early ſeaſon. Their effect on mankind is terrible: death is a certain conſequence; and they die laughing.

CHAP. VIII.

Of yew.

THE trunk of the yew is covered with a reddiſh bark. Its branches ſpread irregularly, and its leaves are compoſed of many ſmall narrow ones, which ſtand regularly on the two ſides of a ſtalk in rows, and are of a blackiſh green. The fruit is compoſed of a green button placed in a red juicy cup, reſembling the huſk of an acorn. The tree is wild in our woods in ſome places, and is planted alſo for ornament; being an ever-green. Children eat the juicy part of the fruit, which is not poiſonous.

The farmer's care muſt be to keep his cattle from the leaves. They will frequently eat the clippings thrown out of gardens, or the young ſhoots when it is planted where they can get at it. When they eat but little of it, they fall into diſorders which often end in their death: but when they ſwallow it in a larger quantity, they die preſently.

BOOK XV. SECT. II.

Such as are not abſolutely poiſonous, but very hurtful.

CHAP. IX.

Of white rot.

THIS is a little obſcure plant, which often grows in abundance where it is little minded, and is the cauſe of terrible miſchief to the farmer. It conſiſts of a parcel of ſtalks which lie upon the ground; and ſpread themſelves in a very irregular manner. They are as ſmall as a packthread, and of a pale whitiſh green. Sometimes they riſe a little upwards, but rarely.

Theſe ſtalks ſend down little tufts of fibrous roots in various places; and where theſe ſhoot from the lower part, there riſe from the upper ſide, leaves. Theſe are as large as a half crown-piece, and of a round ſhape, but indented irregularly at the edges. The ſtalk which ſupports them, is long and ſlender; and it is inſerted not at the edges, as in moſt other plants, but in the middle. The colour of the whole leaf is whitiſh, and it is of a thin ſubſtance. The flowers are very ſmall and inconſiderable: they are of a pale colour, and they ſtand on ſlender foot-ſtalks riſing from the boſoms of theſe leaves. The ſeeds are ſmall and brown.

This is the whole of a plant, whoſe low condition renders it unſuſpected by the farmer, while it is the ruin of his flock. It is common in marſhy grounds, where it runs cloſe to the bottom, and is hid among the graſs. The ſheep eat of it abundantly among the graſs, being pleaſed with its ſharp taſte. The conſequence is, their falling into that terrible diſtemper the rot: from which few that have eaten any large quantity of this herb, eſcape.

CHAP. X.

Of ſun-dew.

THIS is another plant fatal to ſheep; and which, in the ſame manner, is often overlooked by thoſe who know its bad effects, by reaſon of its ſmallneſs. It is ſix inches high, and is all over of a red colour; and, upon a cloſer examination, it ſurpriſes yet more, by being covered with large drops of water in the moſt violent heats: it hence obtained the Engliſh name ſun-dew; and it is alſo called frequently ros, or roſa ſolis. The root is compoſed of a few ſmall fibres. The leaves riſe in a little tuft eight or ten together. Each is ſupported on a long ſlender foot-ſtalk. They are of the bigneſs of a ſilver penny, round, of a red colour, but covered with very long and ſtiff yellow hairs: upon theſe reſt the great drops of water. The ſtalk riſes in the midſt of theſe, and is upright, ſlender, and has no leaves upon it. It generally divides into two parts at the top. The flowers grow in rows at the top: they are ſmall and white; and they ſeldom open perfectly. The ſeed-veſſel is ſhort, and the ſeeds are very ſmall. This plant grows on boggy grounds; and has a ſharp taſte, for which the ſheep like it. They eat it too frequently, and its effects are the ſame as thoſe of the former. It brings on the rot; and thoſe which have eat much are incurable.

CHAP. XI.

Of louſewort.

THIS is another inhabitant of marſhy grounds, which is hurtful to ſheep, though not ſo fatal as the others. It is a larger plant than either of thoſe, and eaſier ſeen; but it is as often overlooked or diſregarded. The root is compoſed of a vaſt number of fibres, which run deep in the ground. The leaves riſe in little tufts and are ſmall, and beautifully divided. They are of a fleſhy ſubſtance, and of a faint green; but very often they are brown, and ſometimes reddiſh. The ſtalks are weak, and do not ſtand upright: they are ſix or eight inches long, and of a reddiſh colour. They have many leaves reſembling thoſe which grow from the root; and at their tops ſtand the flowers. Theſe are gaping, and of a ſtrong red; and they ſtand in reddiſh and ſtreaked huſks.

All our wet meadows abound with this plant. Its juicy ſubſtance and taſte allure the ſheep to eat of it; and it throws them into many diſorders. There is no herb that has ſo ſpeedy, evident, and certain an effect in fouling the blood. The moſt healthy and clean flock, will, in a fortnight, grow ſcabby and ſcurfy upon the ſkin; their wool will be looſe, and they will be over-run with vermin.

We have before delivered the method of curing this diſorder; and the farmer muſt be careful to obſerve the direction of removing the ſheep to a dry upland paſture. Thoſe are places where the plant cannot grow; and there is no ſecurity but that of the creature's not feeding upon it, while under cure.

CHAP. XII.

Of ſpurge-laurel.

THIS is a ſhrubby plant of a very pleaſing aſpect, and worthy to be introduced into gardens; but it is one that the farmer ſhould extirpate from his fields when he happens to have it. The ſingular appearance renders it eaſily known, and it is only found on hilly grounds. The root is compoſed of long and tough fibres. The ſtem is as thick as a man's thumb; and it is covered with a brown bark. Toward the bottom it is naked; but there are numerous leaves about the upper part. The whole ſhrub is three foot high; and the leaves grow principally at the ends of the branches. They are long, broad, and of a firm ſubſtance: their colour is a deep green; and they in ſome meaſure reſemble the leaves of the common laurel.

The flowers grow in cluſters below the leaves, and they are ſmall and green. After them come berries, which when ripe are black: they are of a longiſh ſhape, and have a ſingle large kernel. It is frequent on waſte ground in hilly places in many parts of England, and flowers early in ſpring. Cattle are tempted by the freſhneſs of the leaves to taſte them; and they are ſo ſharp that they inflame their mouths. Some will eat them in ſmall quantities, and the effect is terrible; they bring on the moſt violent purgings with bloody ſtools; and often theſe complaints reſiſt the power of all remedies, and terminate in the creature's death.

I had in the year 1740 an inſtance of this in three cows, which had been ſeen eating the tops of this ſhrub in April. They all fell into theſe purgings, and though every method was uſed that could be thought of, all three died.

We have elſewhere in its place informed the huſbandman in what manner he is to undertake the cure of theſe diſorders; but it is much better to prevent them by rooting out ſuch hurtful plants, as are their worſt cauſe.

End of the THIRD VOLUME.